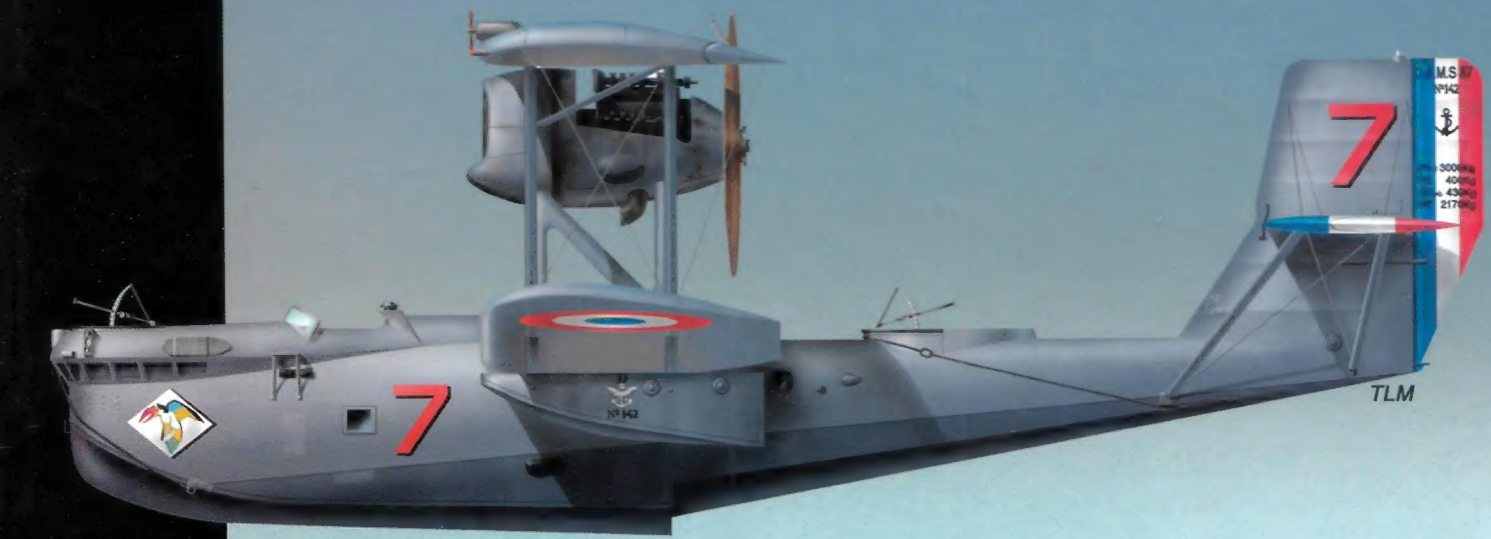
Gérard Bousquet

French Flying Boats of WWII



MMPBOOKS

White (Rainbow) Series No 9120

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STRATUS

Published in Poland in 2013
by STRATUS s.c.
Po. Box 123,
27-600 Sandomierz 1, Poland
e-mail: office@mmpbooks.biz
for
Mushroom Model Publications,
e-mail: rogerw@mmpbooks.biz

http://www.mmpbooks.biz

ISBN
978-83-63678-06-7

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Printed by
Drukarnia Diecezjalna,
ul. Żeromskiego 4,
27-600 Sandomierz
www.wds.pl

PRINTED IN POLAND

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Acknowledgements

For once, coverage does not only include operational use, though detail cannot be exhaustive in view of page limitations and the breadth and complexity of the subject. Nevertheless, the author has tried, as far as possible, to clear up some obscure details mainly by describing *Aéronautique Navale* seaplanes by families of aircraft, in accordance with operational requirements and their various categories.

Detailed knowledge of the operational history of aircraft is good in itself, but this is not the only point, since knowing how and why each aircraft came into being is also of interest. This is why this work covers not only those aircraft used operationally but also several projects under study towards the end of 1939 as 'paper seaplanes', which illustrated the creativity of design offices at this turning point of history.

To sum up, the following question needs to be asked: what was the real condition of the *Aéronautique Navale's* seaplanes at the beginning of the Second World War both in quantitative and qualitative terms?

We hope that the reader will find satisfactory answers to this enthralling question in this study...

The Editors

Notes from the authors

The French term '*hydravion*' covers all types of aircraft capable of operating from water. This category then subdivides into '*hydravion à coque*' and '*hydravion à flotteurs*'.

In this English translation, the generic term 'seaplane' is used as the equivalent of '*hydravion*', even though 'seaplane' is often used in English to describe an aircraft with floats. The equivalent French term '*hydravion à flotteurs*' has been translated as 'float plane'. '*Hydravion à coque*' is translated as the widely used term 'flying boat'.

The reader will also note the French terms indicating the type of activity intended for each category of aircraft: '*Croisière*', '*Exploration*' and '*Surveillance*'.

It has proved difficult to categorize these terms exactly in English, but they have been retained in French since they usually correspond also to the titles of operational units employing the designated aircraft types. Thus, Flight 1.S.1 incorporated aircraft mainly aircraft belonging to the '*Surveillance*' category and Flight E1, those of the '*Exploration*' type.

The most effective way to understand these French definitions appears to be to relate them to the range of action of the aircraft concerned. Thus, '*Hydravion de Croisière*' corresponds to a very long range maritime reconnaissance aircraft, such as the Breguet 730, Latécoère 611, CAMS 141, Latécoère 523, etc. Typically, these aircraft had ranges of 3,500 to 4,500 km.

'*Hydravion d'Exploration*' corresponds to long range maritime reconnaissance aircraft, typically the Breguet *Bizerte*, Latécoère 302, Loire 70, etc. These had a range of 2,000 to 3,000 km.

Finally, '*Hydravion de Surveillance*' corresponds to maritime reconnaissance aircraft such as the CAMS 55 and Loire 130 having a range of up to 1,250 km.

Breguet 730 N° 01 being hoisted by crane at the Cherbourg base.

CAMS 55H N° 85 / 2S1.2 of Surveillance Flight 2S1 (Lanvéoc-Poumic 1939).

Nevertheless, there are exceptions and qualifications. Thus, in terms of allocation to units, no separate designation exists for those employing '*Croisière*' type flying boats, these being allocated to '*Exploration*' units. Also, CAMS 55s will be found serving in both '*Surveillance*' and '*Exploration*' units.

The text therefore retains the French designation for aircraft types and units. The reader may refer back to the notion of operational range as outlined above to gain greater understanding.

French naval aviation in 1939

In September 1939 the Aéronautique Navale *was an imposing force with about 510 seaplanes spread among its various bases and squadrons, of which 282 aircraft were in operational units. The* Luftwaffe *suffered by comparison, being able to deploy only 208 front line seaplanes at that time*[1].

Comparative analysis: *Luftwaffe – Aéronautique Navale*

Despite the *Aéronautique Navale's* evident numerical superiority, most of its aircraft were obsolete, and recognised as such by the Admiralty. Even though relegated to training rôles, the complement included seaplanes dating from the 1920s (Schreck-FBA 17.HE2 or CAMS 37E for example).

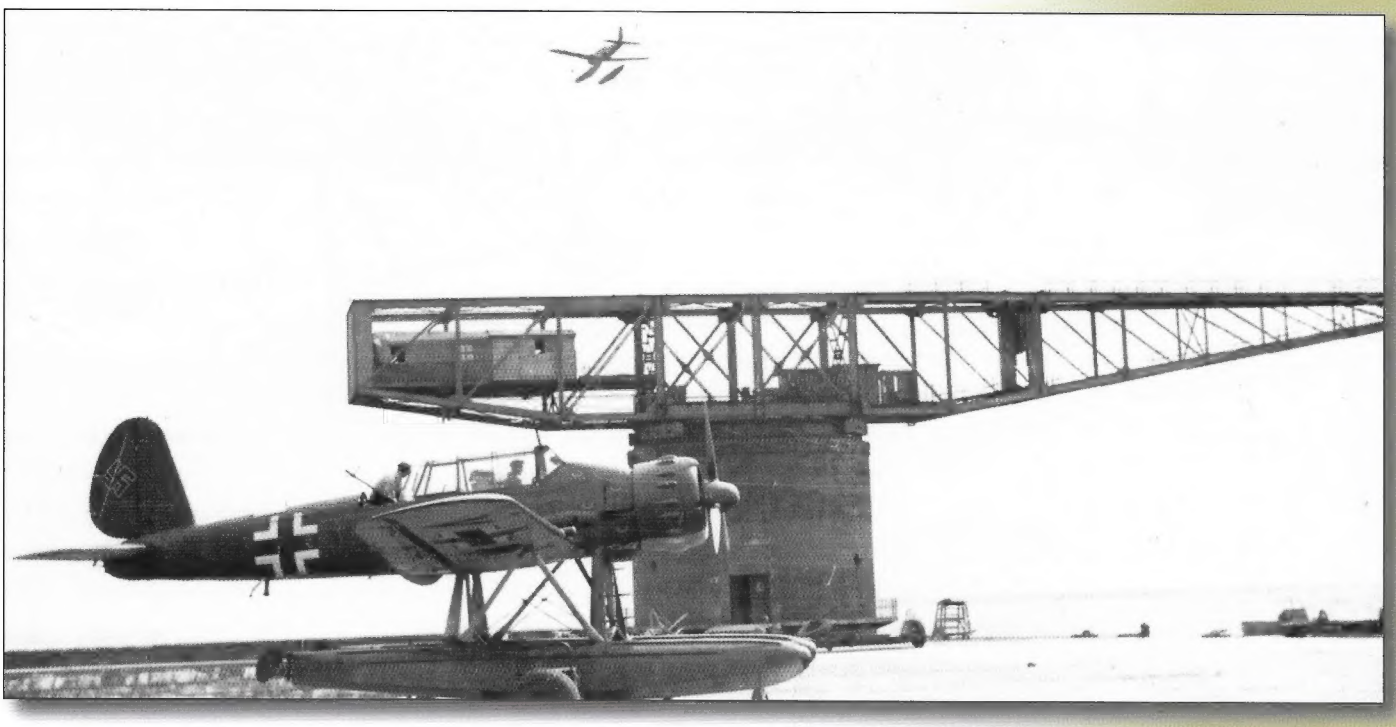
Only the Latécoère 298 torpedo bomber seaplane was above the rest and, on paper, could stand comparison with foreign competition.

At the outbreak of hostilities, the most modern *Aéronautique Navale* seaplanes belonged to the 'Cruiser Class' (1935), these being long range four engine aircraft capable of effectively dealing with the submarine menace.

However, of the three prototypes ordered, those having a comparable mission requirement to the British Sunderland or the American Catalina, only the Potez-CAMS 141 *Antarès* was operational. The Latécoère 611 *Achernar* was still undergoing trials. The Breguet 730, the last of this modest trio, had been damaged in 1938 and, in theory, was still being rebuilt. The providential availability of a handful of long range commercial flying boats having similar characteristics to the 'Cruiser' series made their militarisation an absolute necessity, as was the case. Concerning the three Latécoère 523s, equivalent to the 'Cruiser Class' in terms of range, their conception dated from the early '30s (more precisely from that of the commercial flying boat *Lieutenant de Vaisseau Paris*), despite their arrival in 1938. On the other hand, the various types of caltapultable float planes or flying boats

1. The 208 German seaplanes were as follows: 58 Heinkel He 115, 44 Dornier Do 18, 41 Heinkel He 60, 33 Heinkel He 59, 17 Heinkel He 114, 17 Arado 196. (Source: Gen.d.Lw.b.Ob.d.M-v.1/9/39 b. 31/12/39)

A fine line-up of Gnome & Rhône powered CAMS 55.10 of Flight 2S1 at Lanvéoc-Poulmic. More than one hundred were in widespread use before the war but, technically outclassed by the end of 1939, they only played a secondary role during the conflict, mainly being used in supporting tasks.



recently put into service or about to enter it, such as the Loire 130 or LeO 43, corresponded in fact to programmes already six years old[2].

In the same way, the small Gourdou 810 *Hy* floatplanes and other derivatives of the type, widely used for coastal reconnaissance and on naval vessels during the 1930s, would scarcely bear comparison with the Arado 196 from a technical point of view. This latest German floatplane entered service at the beginning of the conflict, being carried on warships. It was much faster than its French adversaries with its maximum speed of more than 300 km/h. It was also much more heavily armed, with two wing-mounted MG FF 20 mm cannon. The same remark would apply to the Loire 130 and LeO 43 when compared with this shipboard all-metal monoplane. Only the rustic and slow Heinkel 59 float plane, which suffered heavy losses during the Battle of Britain, appeared

The same crane seen at the same place as in the preceding photo (Lanvéoc-Poulmic), but this time under the Occupation, showing an Arado 196 A-3 reconnaissance float plane coded 6W+VN of Bordfliegerstaffel 5./196. *Around fifteen of this type, better armed and faster than its French counterparts, were in service with the Germans at the beginning of the war. In total, series production of the type (more than 500 aircraft) would amount to around four times that of the Latécoère 298. (DR)*

2. The abbreviations LeO for Lioré & Olivier and LATE for Latécoère were two diminutives in current use in the *Aéronautique Navale.*

The Latécoère 298 was the most modern Aéronautique Navale *float-plane of which around thirty were in service at the beginning of the conflict. Shown here are two aircraft of Flight T1 base at Berre before the war.*

A twin-engine Heinkel He 59 C-2 registered D-AHIK, in neutral Red Cross markings, attached to air-sea rescue Flight Seenotflugkommando 1, Norderney. *This type of float-plane was completely obsolete at the beginning of the war, but it continued to give worthy service in the* Luftwaffe, *suffering heavy losses during the Battle of Britain, during which 25 of the type were destroyed by British fighters between July and November 1940.*

A Heinkel 60B, registered D-IPZI, the prototype of the B series fitted with a DB 600 engine. A contemporary of French catapultable observation monoplanes of the 1933 programme (LeO H.43, Loire 130), the Heinkel 60, along with the He 59, was the most outdated floatplane on the German side with its biplane layout, even though it was faster than its French counterparts. Around forty were in Luftwaffe *service at the start of the conflict.*

to belong to an earlier age, but its concept was already about ten years old. Generally, most of the *Aéronautique Navale* seaplanes in service at the beginning of the war had lower performances than their German adversaries, especially in terms of maximum speed, and even more so when compared to landplanes. For most of them, their concepts were based on technical clauses in requirements which were already obsolete.

Given delays in production, this degree of obsolescence was inevitable. In April 1934, *Lieutenant de Vaisseau* Bataille, reporting officer at the CEPA, stated in a study entitled '*Aéronautique Navale*' equipment policy: '*The length of time which elapses between the conception of an aircraft and its service entry in series production is around four years and six months. This time can be broken down approximately as follows: conception of requirements, drawing up programmes (6 months), study of prototypes by manufacturers (6 months), construction and final adjustment of prototypes (1 year), prototype testing at CEPA Saint-Raphaël (1 year minimum), preparation of series production contract (6 months), series manufacture (1 year). Total under the most favourable circumstances: 4 years and 6 months!*'

And even then, this point of view did not take into account the social unrest which would occur two years later in 1936, with its major complications arising from nationalisations which were to slow down French aircraft production even more.

Finally seaplane production for the navy between the two wars suffered largely from two endemic and insidious drawbacks. The first was lesser interest in producing naval aircraft on the part

A line-up of three Heinkel He 114 A-2s. The last of this German manufacturer's biplane line, fewer than twenty of this type of floatplane were deployed in unit service at the beginning of the war. Though considerably faster than its French counterparts, it did not enjoy much success with the Luftwaffe. *About one hundred were manufactured, some of them being exported to Sweden and Romania. (DR).*

of French manufacturers, due to the limited series required for the larger types in comparison to the much more important quantities demanded by the *Armée de l'Air.* Thus, of the smaller types of metal monoplanes, only the Latécoère 298 and Loire 130 went into series production of over one hundred each.

In comparison, the production of heavy multi-engine seaplanes would prove much more lucrative for aircraft manufacturers, but requirements were for only half-a-dozen examples of each type. The exception was the Breguet *Bizerte*, of which 37 were manufactured, but these were spread over seven years!

Secondly, from the aircraft manufacturers' point of view, the Admiralty's demands lacked clarity due to the variety of requirements or their technical complexity. Frequently, a number of different types of aircraft were called for but their specifications were often considered redundant and subject to changes in many details.

Thus, it was not uncommon for a first technical outline to be proposed but substantially altered in the following year or even later, in the context of a 'second modified edition' taking into account the Navy's latest observations. In 1939, Latécoère complained of no less than 151 modifications '*not provided for in the initial contract for the three military LATE 523s and the commercial LATE 522*' imposed over one year dating from the initial official presentation of the prototype, thus considerably delaying series production.

The prototype Loire 70 seen here hoisted by a crane before the war at the Saint-Nazaire factory during tests. Fewer than a dozen of the type were built, this type of Exploration flying boat suffering from structural problems but also from competition from the much more successful Breguet Bizerte, *developed in response to the same technical programme.*

Loire 130 N° 9 (code 7S3.2) about to be catapulted from the 7,600 tonne cruiser La Galissonnière *before the war. The Loire 130 was its manufacturer's most successful aircraft with more than one hundred being built. It was used intensively by the* Aéronautique Navale *and served in Indochina up until 1949.*

Mobilisation plan for commercial seaplanes

As from 16 March 1935, the Air Ministry envisaged that commercial seaplanes within the 1st, 2nd and 3rd military regions (metropolitan France) would be requisitioned at Marignane and that those in the 4th maritime region (French North Africa) would be at Bizerte-Karouba. On the following 31 May, the Ministry stated that 12 commercial CAMS 53 flying boats belonging to Air France would be converted for military use by fitting TO.9 turrets, GPU bomb racks and other lesser items, these machines to be initially stocked at Berre. On 13 March 1936, Vice-Amiral Durand-Viel, Chief of Naval General Staff, informed the Air Ministry of the intention to requisition 33 civil seaplanes available or on order at the moment of mobilisation. Their home bases and other indications (later modified – see table) were to be as follows:

Types	Flights [1] (1st designation)	Flights [2] (2nd designation)	Bases
5 CAMS 53	2E5 (Exploration)	10E	Berre
7 LeO 242	2E6 (Exploration)	11E	Berre
2 Breguet *Saigon*	2E7 (Exploration)	12E	Berre
4 Latécoère 300 [3]	2E8 (Exploration)	13E	Marignane
4 Blériot 519 [4]	2E9 (Exploration)	14E	Marignane
7 Cams 53	4S3	Unchanged	Berre
2 CAMS 5	Command Liaison	Unchanged	Berre
1 Latécoère 521	Empire Liaisons	Unchanged	Marignane
1 LeO 27	Empire Liaisons	Unchanged	Marignane

(1) Initial designations given in Order D.M N° 318 EMG/Aéro/O of 13/3/36.
(2) Changed designations appearing in Order D.M N° 516 EMG/Aéro/O of 21/4/36.
(3) These consisted of LATE 300 Croix du Sud *and the three LATE 301s put into service.*
(4) The surprising figure of four aircraft of this type took account of the order for three additional Blériot 519s, subsequently cancelled. Only the prototype Santos Dumont *was actually built.*

On 24 September 1938, *Contre-Amiral Michelier* updated mobilisation conditions for commercial flying boats as follows:

- seven LeO 242 allocated to Exploration Flight 10E (changed from 11E),
- two Breguet *Saigon* to be used as 'supply aircraft' held in reserve for Breguet Bizerte Flights,
- one Latécoère 301 to be placed at the disposition of an Exploration Flight, since the second had already been incorporated into the *Aéronautique Navale* since May 1938 (the *Lieutenant de Vaisseau de l'Orza*),
- one Latécoère 521 to *Command Liaison*.

Mentioned elsewhere in the same note, it was envisaged to requisition the five LeO H.470s and the LeO.246 on order for Air France to complement the Latécoère 522 *Ville de Saint-Pierre*, already affected by the mobilisation order.

On the declaration of war on 3 September 1939, *Contre-Amiral Michelier* advised the Air Ministry of the measures to be taken concerning commercial flying boats:

- seven LeO 242s were to continue civil flights in the Mediterranean so as not to interrupt commercial traffic. Flight 10E was not yet to be activated,
- two Breguet *Saigon*, one of which was said to be in 'doubtful' condition, would be subject to more detailed examination before being put into service,
- five LeO H.470s were to be immediately requisitioned,
- the only available LeO H.246 was not to be mobilised so as to avoid interrupting its test programme, but study of militarisation of the series was to be speeded up.

The *Lieutenant de Vaisseau Paris* and the *Ville de Saint-Pierre* were, for the time being, placed at the disposal of the Air Ministry for 'major liaison missions'. In the end, most civil seaplanes were taken on charge by the Navy, as it had the greatest need, the timing to be as follows: the LeO 242 (F-ANPA), the Breguet *Saigon* N° 01 (F-AMSV), the Latécoère 521/522 (F-NORD and F-ARAP) in September 1939, followed by Breguet *Saigon* N° 02 (F-AMSX) and the five LeO H.470s in December 1939 and, finally, the series of LeO H.246 as from April 1940.

In February 1940, the Ministry for the Navy decided to pay the Air Ministry for the requisitioned aircraft, taking the amount out of its own budget. Thus, even in wartime, the laws of finance remained unchanged.

LeO 43 N° 13, (code 3S1.9), at Saint-Mandrier in 1940. This type was late to enter service at the beginning of the war. The LeO H.43 was only allocated to supporting observation units, its technical programme already dating from six years earlier.

Technical programmes and categories of *Aéronautique Navale* seaplanes

At the beginning of the conflict, the *Aéronautique Navale* operated many different types of seaplanes. Their great variety was intended to cover most operational needs. To provide a better understanding of the subject, we have endeavoured to classify these seaplanes by 'category of aircraft', basing the analysis on the few existing official documents. It is important to note that, with few exceptions, naval seaplanes were conceived and developed, like their land based counterparts, according to 'technical programmes' corresponding to predefined 'aircraft categories' (Fighters, Exploration, Observation, Torpedo bombing, etc.). This specificity led consequently to Flight designations relative to the function of their aircraft as indicated by the 'seaplane technical category' (e.g. Flights E1 to E9 for Exploration).

Categories of *Aéronautique Navale* seaplanes (September 1939) Water based aircraft:

Category	Missions	General Characteristics	Aircraft Ordered (or requisitioned)	Corresponding Programmes (or equivalents)
Exploration (Class E) & Cruiser	Maritime reconnaissance, Long range liaison	Multi-engine of around 25 tonnes (Cruiser) or 15 tonnes (Exploration)	Breguet *Short* Breguet *Saigon* [1] Breguet *Bizerte* Breguet 730 CAMS 110 Latécoère 301 [1] Latécoère 302 Latécoère 521 [1] Latécoère 522 [1] Latécoère 523 Latécoère 611 LeO 242 [1] LeO 246 [1] LeO 470 [1] Loire 70 Loire 102 [2] Potez-CAMS 141	1928 (civil) 1931 (civil) 1931 (Explor.) 1935 (MP/CPT10) 1931 (Explor.) 1934 (civil) 1931 (Explor.) 1930 (civil) 1935 (civil) 1935 (Cruiser) 1935 (MP/CPT10) 1932 (civil) 1938 (civil) 1938 (civil) 1931 (Explor.) 1934 (civil) 1935 (MP/CPT10)
Armed Reconnaissance. (Class C)	Reconnaissance, Bombing, Torpedo bombing.	Multi-engine of around 10 tonnes	Amiot 150M [3] Bloch 480) Bloch 210 LeO H-46 [4] LeO 257bis/258 Loire-Nieuport LN.10 SNCAC/NC-410	1937 (MP/CPT9) 1937 (MP/CPT9) 1933 1937 (MT/CPT9) 1933 1937 (MT/CPT9) 1937 (MT/CPT9)
Reconnaissance, Torpedo-bombing, (Class T)	Torpedo bombing, Observation, Reconnaissance	Single-engine	Latécoère 290 Latécoère 298 P.L.15	1930 1937 1931
Coastal Observation (Class S)	Observation, Training	Single or twin engine of 3 to 4 tonnes. Catapultable	Breguet 790 CAMS 55 Gourdou 810 to 820 LeO 43 Loire 130 SE-400 (ex SE-10) Potez-SNCAN 180 [5]	1938 (prog.A46) 1926 1930 1933 1933 1938 (prog.A46) 1938 (prog.A46)

Basic Seaplane Training	Conversion Schools	Two-seat single engine or twin-engine four-seat	CAMS 37 Farman 470/471 Loire 501 Minié MC-20 Potez-SNCAN 180 (5) SNCAO CAO-30 Schreck-FBA 17.HE2 Schreck-FBA 293/294	1924 1936 1930 1938 (prog.A49) 1938 (prog.A46) 1938 (prog.A49) 1924 1930

Ship based aircraft:

Category	Missions	General Characteristics	Aircraft Ordered (or requisitioned)	Corresponding Programmes (or equivalents)
Heavy onboard Reconnaissance (Class S.B)	Observation, Gunnery control, smoke screen laying, semi-dive bombing	Single or twin engine, 3 to 4 tonne, catapultable, 3 seat.	Breguet 792 Loire 130 Gourdou 130 (6) SNCAC/NC-420	1938 (prog.A62) 1933 1938 (prog.A62) 1938 (prog.A62)
Light onboard Reconnaissance (Class S.B)	Observation Reconnaissance Bombing	Single-engine, 1.6 tonne, folding wings, catapultable	Gourdou 120 Gourdou 832 Potez 452 SNCAM/HD-730	1938 (prog.A50) 1933 1931 1938 (prog.A50)
Attack (Class A)	Aircraft attack Semi-dive attack.	Single-engine float plane, Catapultable.	Loire 210 Potez-SNCAN 170 (7) SNCAM/HD-780	1933 1938 (prog.A75) 1938 (prog.A75)
Observation Reconnaissance	Small two seat, submarine based seaplane	Single-engine	Marcel-Besson MB-411	1924 (8)

(1) Requisitioned civil aircraft. These commercial flying boats, developed for civilian use and militarised on mobilisation appear in the 'Exploration' category by simple equivalence based on their technical characteristics.

(2) The Loire 102 was ceded to the Navy in 1938

(3) Destroyed before the war. Abandoned

(4) Destroyed before the war. Abandoned.

(5) Project abandoned. The Navy placed the Potez-SNCAN 180 in two different official categories, according to its missions. As a result, like the Loire 130, it appears twice in this table

(6) Project abandoned.

(7) Project abandoned.

(8) This category of seaplane is mentioned here only as an indication since, in 1939, the MB-411 was the last development of the MB-35, developed under an 'Observation and Reconnaissance' programme dating from 1924 and not renewed in following years.

Dornier 18 G-1, code RZ+AT of 2./Seenotstaffel *(2nd Air-Sea Rescue Flight). This type of flying boat fulfilled a polyvalent role of air-sea rescue and coastal reconnaissance at the beginning of the war. It was later supplanted by the Dornier 24 and Breguet* Bizerte *in air-sea rescue units. Approximately 180 Dornier 18 were manufactured. At the beginning of the war, some forty of the type were in service: it had no direct equivalent in the* Aéronautique Navale *and was situated at an intermediate level between the twin engine CAMS 55 and the three and four engine French exploration types such as the Breguet* Bizerte *or the Latécoère 302.*

Disposition of *Aéronautique Navale* seaplanes

Study of *Aéronautique Navale* organisation for this period shows that most of the 500 seaplanes allocated to this arm were not in first-line service and that, therefore, they constituted no direct threat to the *Luftwaffe*. In fact, only the 282 aircraft listed in the table below could be considered as really operational, constituting an immediately available naval air force. They were as follows, as listed on 20 September 1939.[3]

Initial situation of *Aéronautique Navale* seaplane units

Commands	Units	Bases	Seaplanes
Observation			
Admiral North	1S1	Cherbourg	5 CAMS 55, 3 Loire 130
	1S2	Cherbourg	4 Latécoère 290
Admiral West	2S1	Lanvéoc	3 CAMS 55, 4 Gourdou 812
	2S2	St-Trojan	4 CAMS 37
	2S4	Lanvéoc	4 CAMS 37, 2 Gourdou 811
Admiral South	3S1	Hyères	8 Gourdou 812
	3S3	Berre	6 Gourdou 810
	3S4	Berre	3 CAMS 55, 2 Breguet-Short, 4 Farman 470/471
	3S6	Aspretto	1 Loire 130, 3 Gourdou 810, 5 PL.15
	4S1	Karouba	8 CAMS 55
	4S2	Karouba	3 CAMS 55, 2 LeO 258
Antilles (W.Indies)	8S2		4 Gourdou 812
Tahiti	8S5		2 CAMS 55, 1 CAMS 37

3. Source: D.M N° 1745 EMG/Aéro of 26/09/39 (updated theoretical strength).

On the Berre naval air base, crews of Escadrille *4T1 in front of a Latécoère 290.*

Commandant Teste aviation			
	F1H	Cdt.Teste	1 Latécoère 298
	HB1	Oran	8 Latécoère 298
	HB2	Berre	10 Latécoère 298
	HS1	Oran	11 Loire 130
	HC1	St-Mandrier	12 Loire 210
Atlantic Fleet (battleships, cruisers, submarine Surcouf)			
	HC2		6 Loire 130, 3 Loire 210
	HS2		8 Loire 130
	HS4		6 Loire 130
	HS7	Surcouf	1 Marcel-Besson M.B 411
Exploration			
	E1	Port-Lyautey	5 Breguet *Bizerte*
	E2	Karouba	5 Breguet *Bizerte*
	E3	Berre	5 Breguet *Bizerte*
	E4	Dakar	3 Latécoère 302, 1 Latécoère 301
	E5	St-Raphaël	5 Breguet *Bizerte*
	E6	Lanvéoc	3 Latécoère 523*
	E7	Karouba	6 Loire 70
	E8	Lanvéoc	1 Potez-CAMS 141
	11E	Berre	5 LeO 470
	12E	Lanvéoc	1 Latécoère 521, 1 Latécoère 522
Bombing			
	F1B	Berre	2 LeO 257bis
	B1	Berre	11 LeO 257bis
	B2	Berre	8 LeO 257bis
	B3	Berre	11 LeO 257bis
Torpedo bombing			
	T1	Berre	10 Latécoère 298
	T2	Berre	10 Latécoère 298
	T3	Berre	8 Latécoère 298
Mediterranian Fleet (Cruisers)			
	HS5		10 Loire 130
	HS3		6 Loire 130, 3 Gourdou 832
Far East Naval Forces (Cruisers and Colonial Sloops)			
	HS6		1 Potez 452, 7 Gourdou 832, 2 Loire 130
Other Vessels (Cruisers and Colonial Sloops)			
	HS7		1 Potez 452, 2 Gourdou 832, 2 Loire 130

** This represents the theoretical strength of Flight E6 since one of the LATE 523s was lost on 18 September 1939.*

Seaplane losses

To give an idea of the industrial potential of the two combatants and its implications at the beginning of the conflict, we simply note that during the first four months of the war, the *Luftwaffe* lost 38 seaplanes to accidents or aerial combat. But, during the same period, German manufacturers produced 100 replacements, or almost three times more than their French counterparts, who were unable to deliver any more than 39 during the same period. Despite this low figure, it was compensated for by the *Aéronautique Navale's* much lower losses of only 13 aircraft.

Comparative table of *Luftwaffe* and *Aéronautique Navale* losses and deliveries of seaplanes (Operational units/September–December 1939)

Forces	Losses	Deliveries
Luftwaffe (208 seaplanes)	8 Heinkel 59 3 Heinkel 60 5 Heinkel 114 9 Heinkel 115 13 Dornier 18	None None None 52 Heinkel 115 22 Dornier 18 26 Arado 196
total	38 (1)	100 (2)
Aéronautique Navale (282 seaplanes)	2 LeO 257bis 1 CAMS 37 1 Latécoère 523 1 Gourdou 811 1 Gourdou 812 1 Gourdou 813 1 LeO H.470 2 Loire 210 3 Loire 130	None None None None None None None 2 Loire 210 14 Loire 130 2 Breguet *Bizerte* 21 Latécoère 298
total	13 (3)	39 (4)

(1) Source: Totalverluste an Kriegsflugzeugen eim Gen.d.Lw.w.b.Ob.d.M (v.1/9/39 b.31/12/39)
(2) Source: Gen.St.d.Lw.8 Abt. v. 27/6/45.
(3) Source: Unit archives.
(4) Source: D.M N° 470 EMG/Aéro/O of 2/3/40.

FLYING BOATS

Breguet-Short *Calcutta*

The Breguet-Short *Calcutta* used by the French Navy was a military derivative of the British three-engine Short S.8 commercial flying boat. The prototype, registered G-EBVG, made its maiden flight in England on 14 February 1928.

This aircraft was the first all-metal seaplane to be designed and built in England and put into commercial service. The aircraft was capable of carrying 15 passengers and a crew of three. Half a dozen examples were used by Imperial Airways from 1929 on services to India. In parallel, the British evolved a military derivative, the *Rangoon*. The first of five built flew for the first time on 2 December 1930.

This type of seaplane was of interest to French naval aviation, since it did not have an equivalent all-metal exploration aircraft at that time and was looking for a successor to its twin-engine CAMS 55. In February 1929, barely a year after the first flight of the prototype Short *Calcutta*, the Air Ministry ordered a civil version from Short, identical to the British commercial prototype.

The aim of this purchase was to test the aircraft at the CEPA at St-Raphaël[1] to examine, according to the Navy, '*the value of British seaplanes, especially from the viewpoints of commercial viability, seaworthiness and metal construction*'.

On 1 September 1929, Short *Calcutta* S.8 (c/n S.751), bearing the French registration F-AJDB, made its first flight in the hands of Short's pilot Parker, who then ferried the aircraft to France, arriving at Saint-Raphaël via Hourtin on the 10th. The task of evaluation was given to *Lieutenant de Vaisseau* Nomy (later *Amiral*), due to his position as reporting officer. Testing began in October 1929 and was completed in June 1930 after 150 hours flying over the Mediterranean without any

1. C.E.P.A. is the abbreviation used for '*Commission d'Etudes Pratiques d'Aviation Maritime*', which can be translated as 'Commission for Practical Testing of Maritime Aviation'. This Naval testing centre was set up in September 1920 at Fréjus-Saint-Raphaël to test new types of seaplane, whether military or civil, before their entry into service. A naval pilot, usually highly experienced, was designated as 'Reporting Officer' and charged with following through testing and drawing up one or more 'study reports' concerning the flying characteristics and seaworthiness of the aircraft under test.

Breguet-Short Calcutta *(series N° 1, code 3E1.1),* La Galère Capitane.

Breguet-Short Calcutta (series Nº 1) 'La Galère Capitane' *of Exploration Flight 3E1 (1933).* Aluminium *(overall aluminum) on all surfaces.*

Breguet-Short Calcutta (series Nº 2) 'Le Grand Coureur' *of Exploration Flight 3E1 (1933).* Aluminium *(overall aluminum) on all surfaces.*

Breguet-Short Calcutta *(series N° 4), coded 3S4.5 of Flight 3S4 at Berre. It carries regulation markings current in 1940, these being its place in the Flight (5) and the hull roundel.*

particular incident. The naval airmen were very favourably impressed by the overall characteristics of the Short *Calcutta*, which were well in advance of any French seaplane. As a conclusion, the Navy recommended the acquisition of the aircraft with purchase of the licence and the construction of at least 12 aircraft to be built by the French aircraft industry. Incidentally, *L.V.* Nomy insisted on the allocation of several Short *Calcuttas* to Exploration Flight 3E1 at Berre, of which he was then the commander. In August 1930, it was decided that the civil *Calcutta* which had been the subject of the tests should be ceded by the CEPA to the *Aéronautique Maritime*.

In November 1931, the Breguet company finally succeeded in obtaining the manufacturing licence for the Short *Calcutta* from the British manufacturer. This contract was quickly followed by an order for two aircraft. It was decided that the first, serving as a pattern for the S.8/2 series,

Breguet-Short Calcutta *3E1.2 (series N° 2),* Le Grand Coureur *at Berre.*

would be completely built by the Short factory at Rochester in England. The second was to be constructed in France at Le Havre in a factory specially purchased by Breguet for this work. This factory had an area of several thousand square metres and was located on the banks of the Tancarville canal. Thus, the British designed Short *Calcutta* became the French manufactured Breguet-Short *Calcutta*, as clearly indicated by their rudder description.

The Breguet-Short *Calcutta* N° 1 (Type S.8/2, c/n S762) made its first flight in England on 8 June 1931 and was delivered to Le Havre on 30 August. Delivered by the *Air Union* pilot Costes, it was then taken on charge by the CEPA on 8 September. In November it took part in manoeuvres in the Mediterranean alongside naval vessels. To great surprise, while these missions confirmed the aircraft's strength and endurance, they also revealed its interior arrangements to be uncomfortable and vibrations from the French engines to be greater than the original British-made Bristols. The first French built Breguet-Short *Calcutta* (N° 2 in the series) was launched at Le Havre on 18 March 1932 and was delivered to the CEPA at the end of April. A few months earlier, a second order had been signed for the manufacture of three further Breguet-Short *Calcuttas* S.8/2 (N°s 3, 4 & 5), these to be constructed entirely at Le Havre. The first of these was delivered in November 1932 and the last in March 1933. Test flights of the Breguet-Short *Calcutta* were in the hands of the company's pilot Yves Lantz.

As envisaged, the series production aircraft and the prototype were allocated to Flight 3E1 at Berre as they came off the production line, to replace the ageing CAMS 55s. By March 1933, with the delivery of N° 5, all five aircraft had entered service with this unit, under the command of *Lieutenant de Vaisseau Bergot*. In 1935, the unit was re-designated as Flight E1 and the Breguet-Shorts were little by little retired to second line service with the arrival of the more modern higher performance Breguet *Bizerte*. The most serious accident involving a Breguet-Short affected N° 2 (code E.12) commanded by *Lieutenant de Vaisseau (L.V.)* Glaizot. At around 18:00 on 24 November 1936, the aircraft hit the surface of the Etang de Berre while preparing to alight and was completely destroyed. Two of the crew, *L.V.* Glaizot himself and *Second-Maître Radio* Fritz, were seriously injured, both suffering fractures. The remaining aircraft were allocated to the sea instruction school

Breguet-Short Calcutta *(series N° 2),* 'Le Grand Coureur', *coded 3E1.2 of Exploration Flight 3E1 at Berre.*

Breguet-Short Calcutta 3E1.3 (series N° 3), 'Marie la Cordelière' *(Berre – 1933).* Aluminium *(overall aluminum) on all surfaces.*

Breguet-Short Calcutta (series N° 4) 'La confiance' *of Exploration Flight 3E1 (Berre 1940).* Aluminium *(overall aluminum) on all surfaces.*

Breguet-Short Calcutta (series N° 5) 'La Danaé' *of Exploration flight 3E1 (1933).* Aluminium *(overall aluminum) on all surfaces.*

Breguet-Short Calcutta 3S4.5 (series N° 4), 'La Confiance' *(Berre – 1940).* Aluminium *(overall aluminum) on all surfaces.*

at Berre and the training section at Brest. In December 1938, Breguet-Short N° 1 (code BE.10), which had totalled 600 flying hours, was proposed to be struck off.

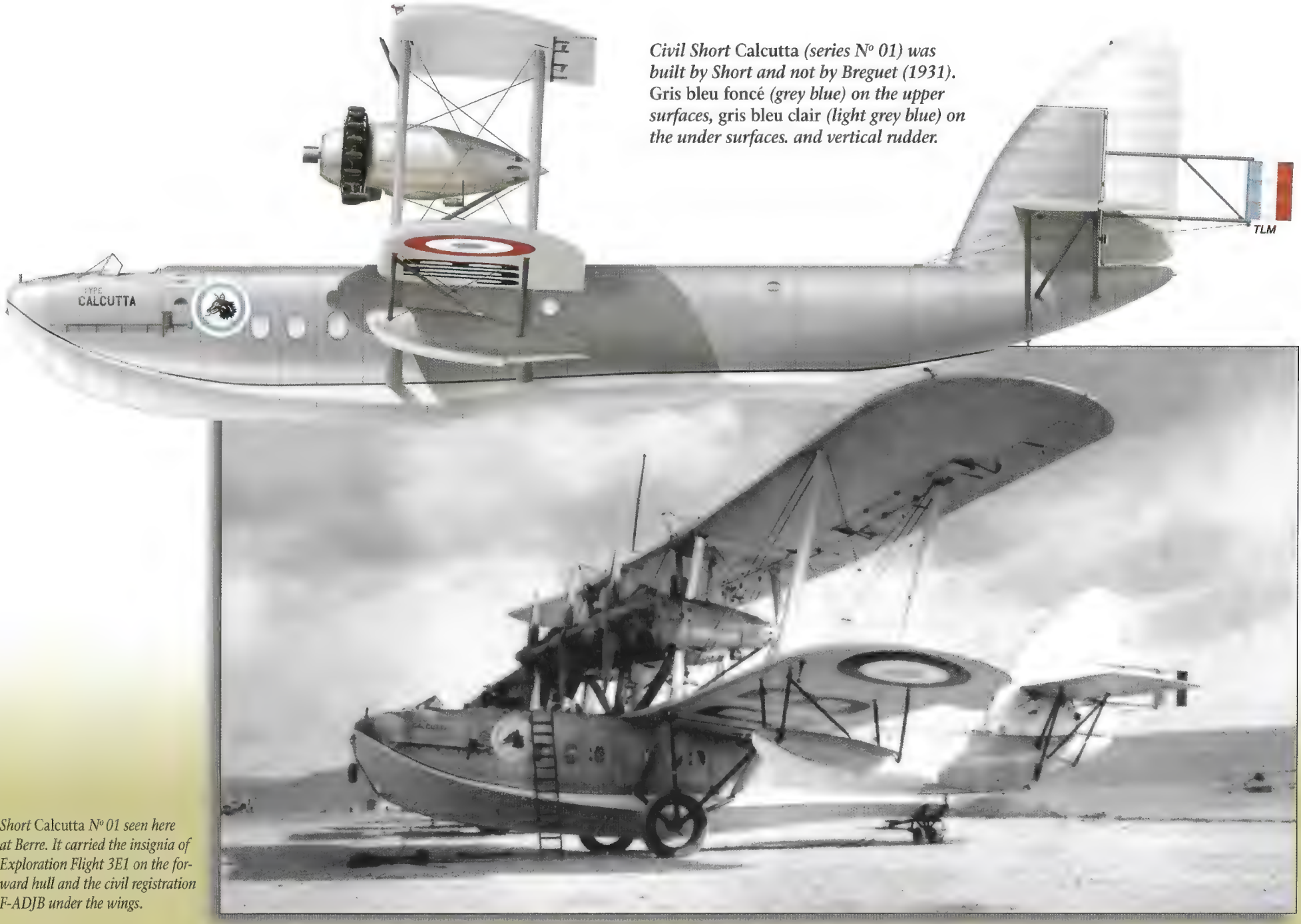
The civil Short *Calcutta*, by now showing considerable corrosion in places, had been out of service since the preceding year. On the declaration of war in September 1939, N°s 3 and 4, two of the three Breguet-Shorts still in flying condition (N° 5 being unavailable), were allocated to Auxiliary Flight 3S4 at Berre. This unit was also equipped with a handful of Farman 470/471 and CAMS 55. The two aircraft, bearing codes 3S4-6 (N° 3) and 3S4-5 (N° 4), were employed on surveillance patrols over the maritime approaches to Marseilles up until the Armistice. After the dissolution of Flight 3S4, officially decreed on 1 August 1940 on the orders of the occupying power, the three Breguet-Shorts which had been declared obsolete in the same month, were stored at Berre waiting to be scrapped.

Despite this the airframe of N° 4, less its instruments, had not been scrapped by 5 August 1941 when it was being towed, apparently to the Hyères roadstead, to be used there as target practice for close range anti-aircraft guns on naval vessels. It is likely that the second last representative of this modest series ended its career in this way since only two remaining Breguet-Short *Calcuttas* still appeared in October 1941 on the list of aircraft being stocked for scrapping without delay, an identical decision to that taken a year earlier.

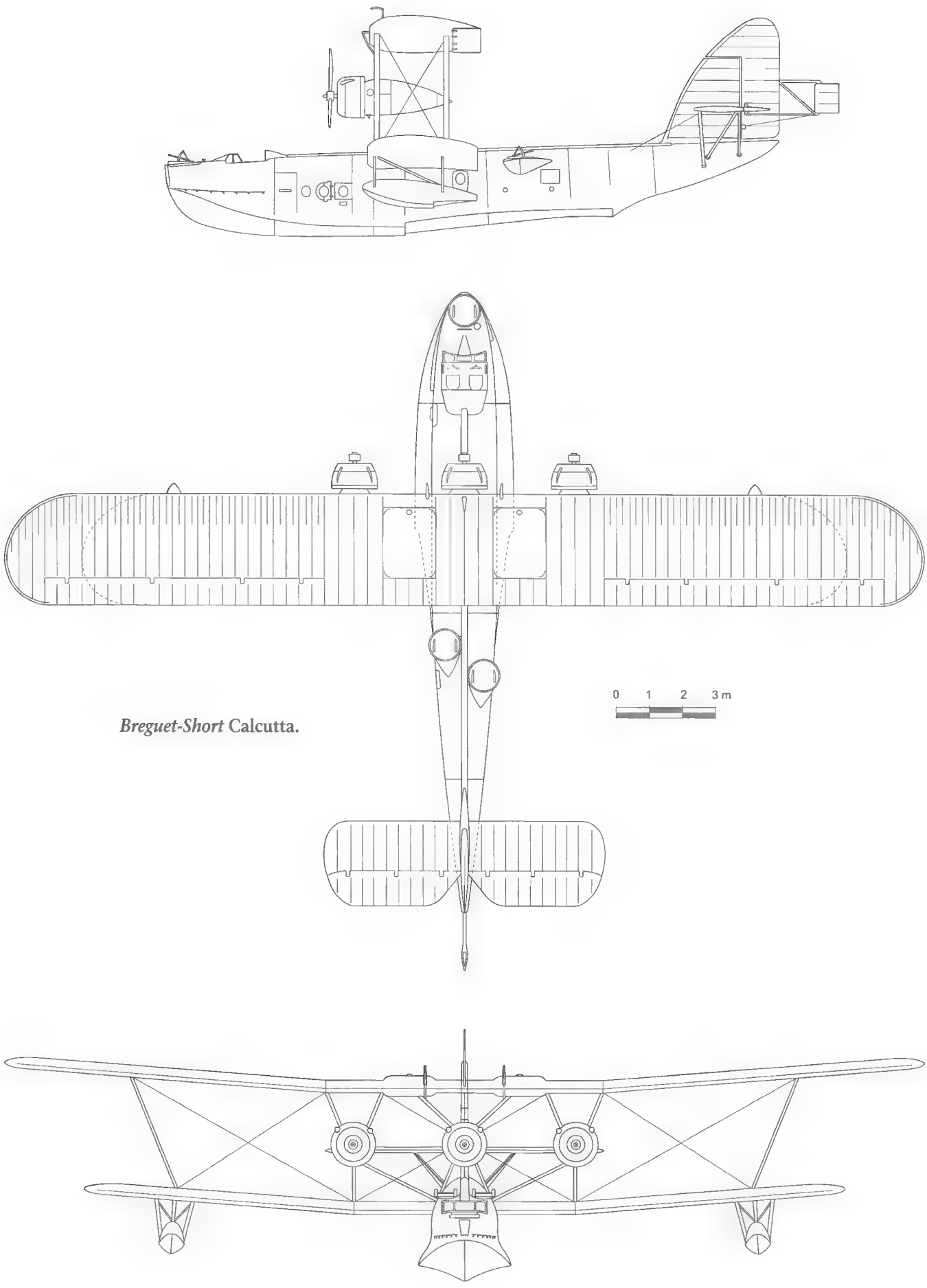
Thus ended the modest career of the Breguet-Short *Calcutta* which, due to its method of construction and ease of operation, had a lasting impact on exploration seaplane operations in the *Aéronautique Navale.*

Air Ministry Contracts:
N° 360/9 of 30/3/29: order for Short *Calcutta* (N° 01, F-AJDB)
N° 821/0 of 14/11/30: order for two Breguet-Short (N°s 1 and 2)
N° 476/1 of 27/8/31: order for three Breguet-Short (N°s 3, 4 and 5)
Quantity manufactured: 6
In *Aéronautique Navale* service: 6 (1929 – 1940)
Units: 3E1/E1, 3S4, Training sections (Berre, Brest)
The five militarised Breguet-Short *Calcutta* were given the following distinct names:
N° 1 *La Galère Capitane* (code 3E1.1 and BE.10), N° 2 *Le Grand Coureur* (code 3E1.2 and E.12), N° 3 *Marie la Cordelière* (code 3E1.3 and 3S4.6), N° 4 *La Confiance* (code 3E1.4, E18 and 3S4.5), N° 5 *La Danaé* (code 3E1.5 and BR.40).
The civil Short *Calcutta* (sometimes known as Short *Calcutta* 00) was registered F-AJDB at the beginning of its career, with the marking 'Type Calcutta' on each forward side of the hull.
The 'wolf's head' insignia of Flight 3E1/E1 appeared on all six aircraft.
General characteristics:
Flying boat, metal construction, sesqui-plane, three engines
Power plants: 3 x Bristol Jupiter IX of 485 hp (prototype Calcutta), 3 x Gnome et Rhône Jupiter Akx of 480 hp (Breguet-Short)
Propellers: 3 x four-bladed Breguet 127 (Breguet-Short)
Length: 20.35 m (66.76 ft),
Span: 28.35 m (93.01 ft) [lower wing: 23.17 m (76.01 ft)],
Wing area: 169 m² (1819 sq ft),
Height: 6.85 m (22.47 ft) [8.19 m (26,87 ft) on wheels]
Empty weight: 6,025 kg (13,283 lb), Laden weight: 10,200 kg (22,487 lb)
Maximum speed: 175 km/h (109 mph) at sea level
Ceiling: 4,000 m (13,123 ft)
Climb time: 17 minutes to 2,000 m (6,562 ft)
Range: 1,500 km (932 miles), Crew: 5
Defensive armament: 3 x 7.7 mm (.303 inch) Lewis machine guns, Offensive armament: 4 x 75kg (165 lb) G2 bombs

Civil Short Calcutta *(series N° 01) was built by Short and not by Breguet (1931).* Gris bleu foncé *(grey blue) on the upper surfaces,* gris bleu clair *(light grey blue) on the under surfaces. and vertical rudder.*



Short Calcutta *N° 01 seen here at Berre. It carried the insignia of Exploration Flight 3E1 on the forward hull and the civil registration F-ADJB under the wings.*



Breguet-Short Calcutta.

Breguet 521 *Bizerte*

Technical Programme Origins

While this aircraft is often noted as originating with a 1932 technical requirement, the Breguet *Bizerte* in fact corresponded to a programme for an 'open seas reconnaissance and anti-submarine seaplane' (Class E). This was drawn up in 1931 by *Capitaine de Vaisseau* Lartigue (later *Amiral*) then acting director of 'Maritime Air Forces'. It had become necessary to find a replacement for the twin-engine CAMS 55 and three-engine Breguet-Short *Calcutta* of earlier conception.

The basic requirement was for an all-metal multi-engined seaplane having a maximum speed of 210 km/h, a theoretical ceiling of 3,500 m and a crew of six. The range required in still wind was 1,800 km. Offensive armament was to be four 75 kg or two 150 kg bombs.

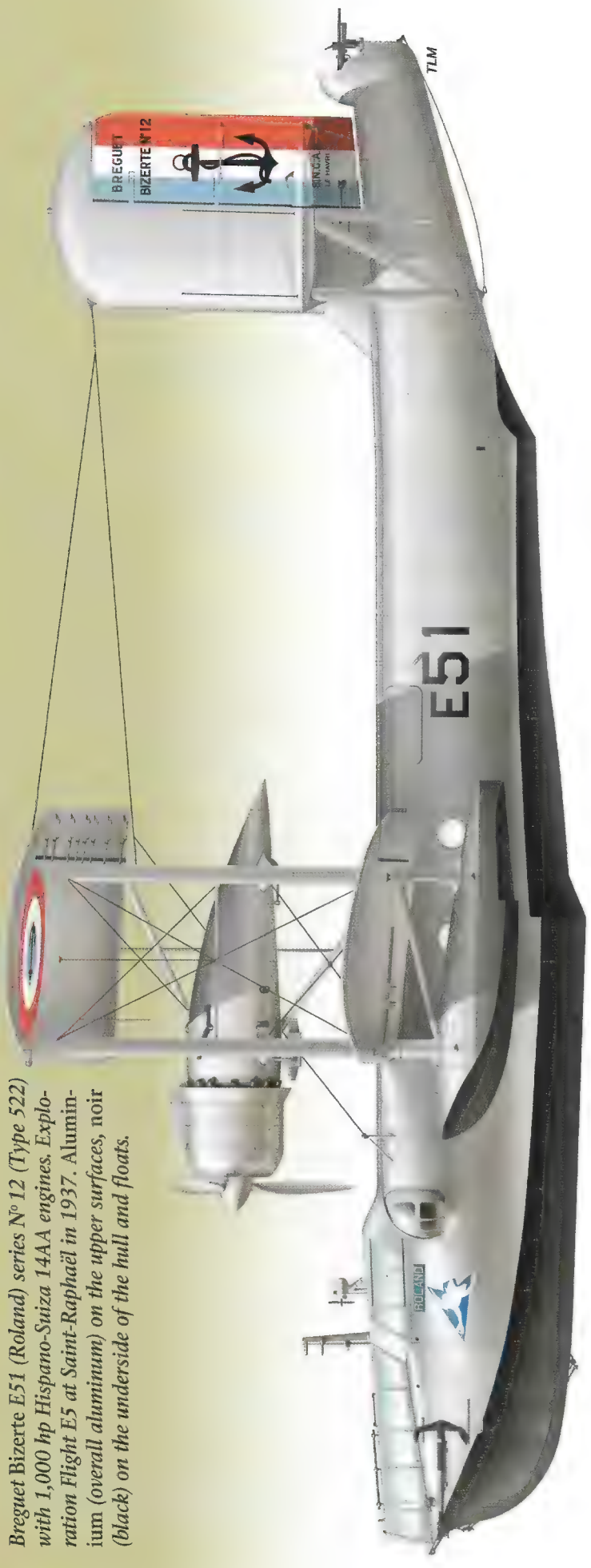
The aircraft was also expected to *'be well capable of alighting in a heavy swell and taking off in very choppy waves, to be easy to fly and have a good range'*. There was no special requirement as to maximum weight but a useful load of 1,400 kg was specified. Among the 20 proposals submitted by manufacturers to the CEPANA on 4 November 1932[1], only three, all three-engined, were followed up by a prototype: the Loire 70, Latécoère 580 (future 582) and the Breguet 521, a metal sesqui-plane flying boat, the latter being by far the most promising.

History

When preparing plans for the 521, Breguet already benefited from the experience gained through constructing four British designed Breguet-Short Calcuttas in its factory at Le Havre.

1. C.E.P.A.N.A initially stood for '*Commission d'Examen des Projets d'Appareils Nouveaux de l'Aéronautique*' (Examining Commission for New Aircraft Projects). It later became '*Commission d'Examen des Prototypes et des Appareils Nouveaux d'Aviation*' (Examination Commission for Prototypes and New Aviation Appliances). This was a State organisation created by decree on 9 February 1929. This commission, which included two naval representatives, met regularly to evaluate aircraft and seaplane proposals put forward by French manufacturers, usually in response to a predefined technical programme.

The prototype Breguet Bizerte *undergoing tests (Le Havre – 1933).*



Breguet Bizerte *E51 (Roland) series N° 12 (Type 522) with 1,000 hp Hispano-Suiza 14AA engines. Exploration Flight E5 at Saint-Raphaël in 1937. Aluminium (overall aluminum) on the upper surfaces, noir (black) on the underside of the hull and floats.*

The new flying boat, soon to be named *Bizerte*, was evidently a direct descendant of the *Calcutta* which inspired the design office led by the engineers Laubeuf and Ricard. The prototype Breguet *Bizerte*, powered by three 820 hp Gnome & Rhône 14 Krsd engines, was flight tested by the company pilot Yves Lantz on 11 September 1933. On 4 January 1934, an initial order for three aircraft was placed with the manufacturer by the Air Ministry. This order included the prototype, which was paid for later.

On 23 January 1934, the Breguet *Bizerte* was flown from Le Havre to Fréjus-Saint-Raphaël to begin its CEPA tests, during which it demonstrated good flying qualities and excellent seaworthiness after a few structural improvements. In September 1934, the prototype, in the company of another Exploration type (a LeO H-256 floatplane), went on a Mediterranean cruise to determine its endurance qualities.

In May 1935, while the prototype was undergoing factory modifications, N° 2 entered service with Flight 1E2 at Cherbourg, commanded by *Capitaine de Corvette* Protche[2], this being the first unit to receive the type. When N° 3 left the factory in January 1936, it emerged fitted with a long 'glasshouse' observation position in the bow, with casemate firing posts forward and through hatches at the rear (five Darne 7.5 mm machine guns) since the first two prototypes had not been satisfactory in this respect.

By the time the first Breguet *Bizertes* arrived with operational units (E2 at Cherbourg and E3 at Berre) during the first half of 1936, the Navy had already ordered a total of 19 aircraft through two additional contracts. One of these aircraft was fitted with 1,000 hp Hispano-Suiza 14 AA engines equipped with automatically variable-pitch Hamilton propellers. This aircraft (N° 12 in the series) was designated Breguet 522.

In 1937, as a result of aircraft industry nationalisations, SNCAN was from then on responsible for delivering the Breguet *Bizerte*, a

2. As will be seen later on, this very experienced naval officer was heavily involved between 1935 and 1940 in studies concerning large maritime patrol seaplanes for the Navy. He commanded the first formation equipped with the Breguet *Bizerte* while overseeing its operational introduction. Later, he was in charge of supervising prototype tests of 'cruiser' flying boats (CAMS 141, Breguet 730 and LATE 611).

further nine being ordered followed by three more at the end of the year, bringing the total to 31 aircraft. From then on, the aircraft flew with four units (E1, E2, E3 and E5). During that year the Breguet *Bizerte* was mainly deployed in the western Mediterranean and the Middle East, taking part in cruises by these units. At the end of 1938, one of these units made a round tour of West Africa as far as Dakar, where another was also detached during the first half of 1939.

On mobilisation, the four Flights (E1, E2, E3 and E5) were equipped with a total of 20 Breguet *Bizertes.*

In September, a new *Aéronautique Navale* armament plan reduced the number of Breguet *Bizertes* in each unit from five to four. The four flying boats which thus became available were used to form a new exploration Flight (E9) based at Berre.

At the beginning of January 1940, five Flights were based either in metropolitan France (E.2, E.9) or in French North Africa and French West Africa (E.1, E.3 and E.5). To ensure improved coverage of the waters off North Africa, an autonomous unit of two Breguet *Bizertes* of Flight E.3 was detached to Arzew (Algeria) in February 1940.

During the same month, the first Breguet *Bizerte* (Flight E.5) to be lost in wartime operations sank at the entry of Casablanca harbour after breaking down off the Moroccan coast. A second aircraft was destroyed after running aground in the Landes following a forced ditching (Flight E.2).

By that time, 34 Breguet *Bizertes* had been delivered. The last three to be ordered (N°s 35, 36 and 37) were never taken on charge by the Navy and were seized in an incomplete state by the occupying power.

In June 1940, a third aircraft was accidentally destroyed, this time by fire, at Arzew (Flight E.3). On 3 July, the French Fleet was attacked at anchorage by British warships at Mers el-Kebir. Flight E.2 based at Arzew was ordered to bomb the British vessels. During this operation, carried out by two Breguet *Bizertes*, one of them (code E.21) was machine gunned and damaged by a Skua fighter from the aircraft carrier HMS *Ark Royal.*

Breguet Bizerte *E9.2 of Exploration Flight E9 (Berre – 1940).* Aluminium *(overall aluminum) on the upper surfaces,* noir *(black) on the underside of the hull and floats.*

Breguet Bizerte *E12 (series N° 18)* 'Le Grand Coureur' *over the Marseille aera.*

Breguet Bizerte *E26, N° 14, flying in formation with E27, N° 23 (Flight E2 based at Cherbourg).*

A Breguet Bizerte *requisitioned by the* Luftwaffe *in 1940 and allocated to air-sea rescue Flight* 1./Seenotstaffel *(Lanvéoc-Poulmic).*

In July, a fourth and final Breguet *Bizerte* was destroyed at Arzew by the explosion of one of its own bombs.

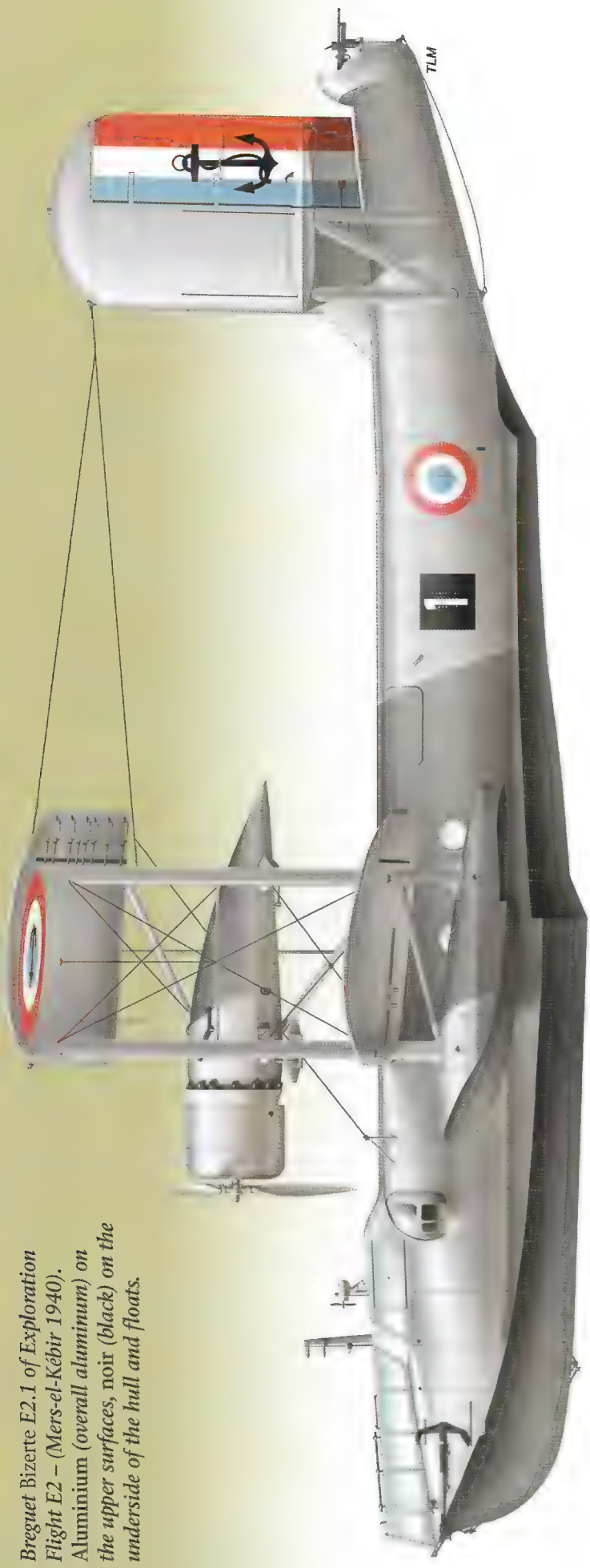
In the autumn of 1940, only two flights equipped with this aircraft were still authorised to fly, E.1 at Karouba and 9E at Berre, in order to counter possible British attacks in the Mediterranean. At the same time, the Germans seized two Breguet *Bizertes* abandoned by the Navy at Hourtin and bought a further eight from the French government to form a first air-sea rescue flight operating from Hourtin and Lanvéoc-Poulmic as from September 1940 (*1./Seenotstaffel*).

In total, twenty of these aircraft, along with those seized during the occupation of the southern zone in November 1942, were used by the *Luftwaffe* alongside Dornier 24s for ambulance missions up to August 1944. These were grouped in two flights, the second (*3./Seenotstaffel*) being based at Berre.

Given the severe operating conditions, incomparable to the use to which the French had put these aircraft up to then, the *Luftwaffe* lost several Breguet *Bizertes* in accidents and two were shot down by the RAF in 1940 (N° 11) and in 1942 (N° 37). Only one survived the German defeat (N° 4), it being recovered intact at the Caudebec-en-Caux factory in July 1944. It was returned to service at Saint-Mandrier during the same year, being allocated in December to Transport Flight 9F.Tr, soon renamed 30S, with which it undertook liaison missions in the Mediterranean until it was struck off following an engine fire and scrapped the following year.

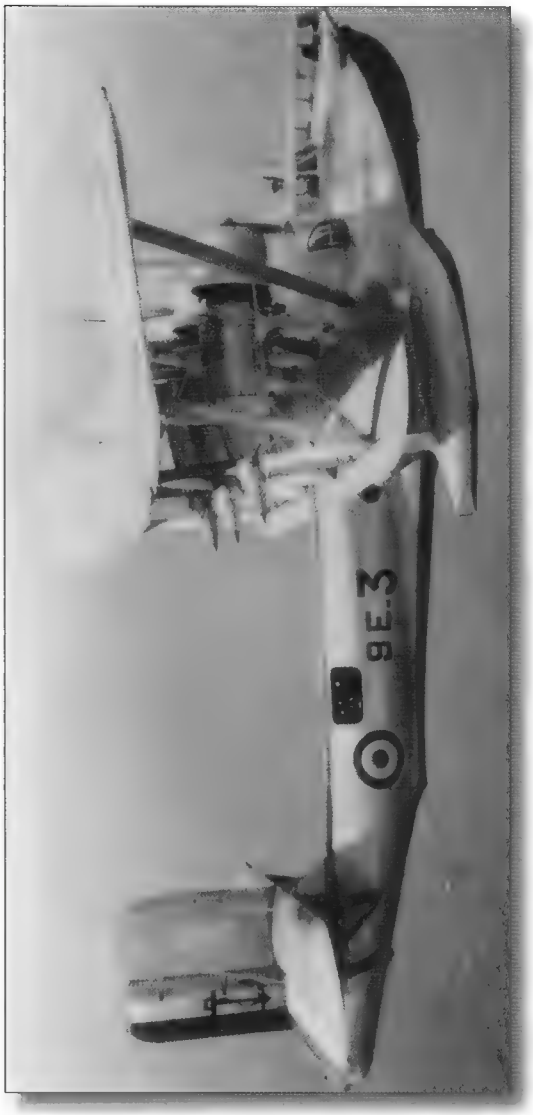
Air Ministry Contracts:
1389/7 of 25/10/37 (N°s 29 to 31)
1648/8 of 28/11/38 (N°s 32 to 34)
2058/9 of 13/3/40 (N°s 35 to 37)
Quantity Manufactured: 37
In *Aéronautique Navale* Service: 34
Flights: 1E2, E1/1E, E2, E3, E4, E5, E9/9E, 9F.Tr., 30S (1935 – 1946).
Luftwaffe: Air-sea rescue flights
1./Seenotstaffel (Code W4 in 1944) and
3./Seenotstaffel (Code M6 in 1944)
Distinct Names: at least 16 Breguet *Bizertes* bore distinctive names, for example: *La Recherche, La Résolue, Le Corsaire, Le Grand Coureur*, etc...

Breguet* Bizerte *E23 (series N° 14) at Arzew in 1940. Exploration Flight E2.* Aluminium *(overall aluminum) on the upper surfaces,* noir *(black) on the underside of the hull and floats.



Breguet Bizerte *E2.1 of Exploration Flight E2 – (Mers-el-Kébir 1940).* Aluminium *(overall aluminum) on the upper surfaces,* noir *(black) on the underside of the hull and floats.*

Breguet Bizerte *9E.3 of Exploration Flight 9E at Berre in 1940. About twenty of this type of flying boat were in service at the beginning of the war. Despite their outdated sesqui-plane configuration, they proved most useful in anti-submarine warfare. They were widely used by the* Luftwaffe *in two air-sea rescue units.*



General Characteristics:

Metal hulled three-engine sesqui-plane flying boat.

Span: 35.11 m (115.19 ft)

Length: 20.48 m (67.19 ft)

Height (without trolley): 7.77 m (25.49 ft)

Wing Area: 162.6 m² (1,726 sq ft)

Empty Weight: 9,260 kg (20,415 lb)

Laden Weight: 16,600 kg (36,597 lb)

Engines: 3 x 850 hp G.R.14 Kirs 1 (standard version).

Propellers: Gnome & Rhône 7.80m (25.59 ft)

Crew: 9

Maximum Speed: 237 km/h (147 mph) at sea level

Cruising Speed: 166 km/h/90 knots (103 mph)

Climb Time: 43 minutes to 5,000 m (16,404 ft)

Ceiling: 5,000 m (16,404 ft)

Take-off Time (no wind): 48 sec 16.5 tonnes (36,376 lb)

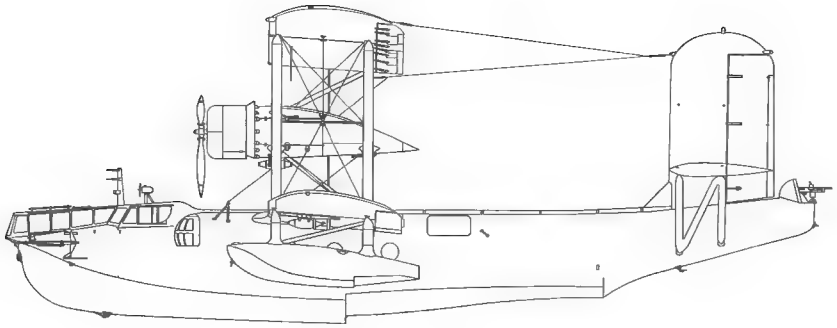
Range: 2,000 km (14.2 tonnes) / 1243 miles (31,306 lb)

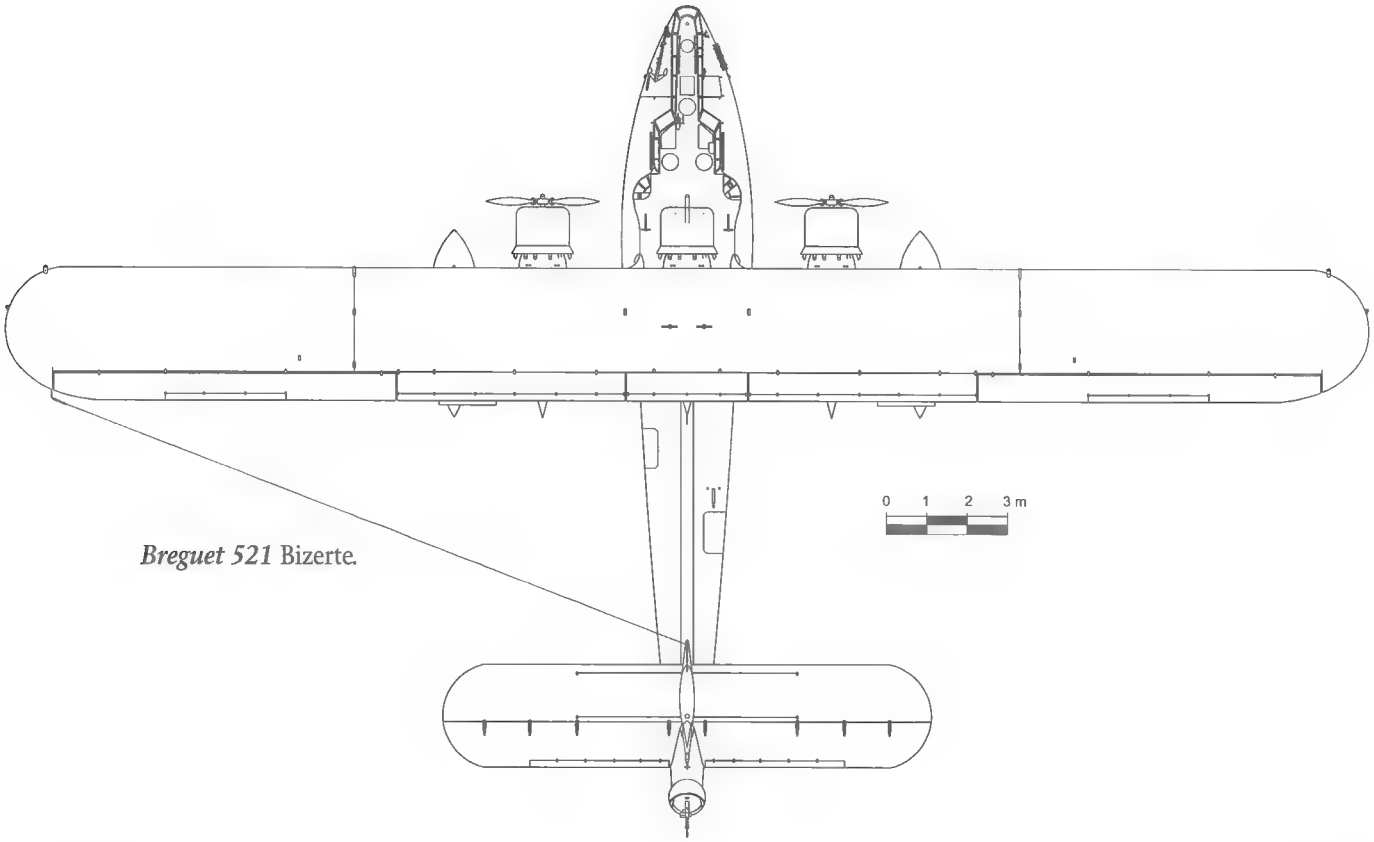
Defensive Armament: 5 x Darne 7.5 mm machine guns

Offensive Armament: 4 x 75 kg (165 lb) G2 bombs.

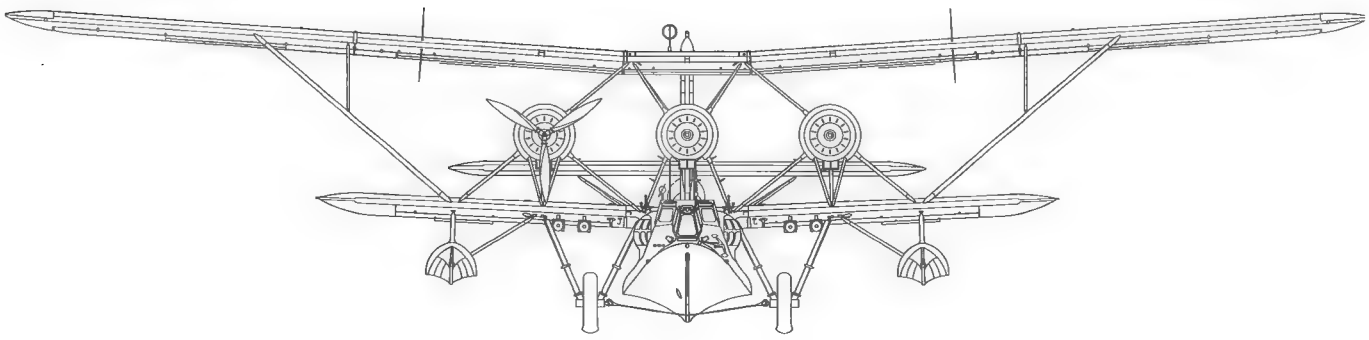
Breguet Bizerte *E34* La Résolue *(series N° 4) with Exploration Flight E3 at Berre.*

Breguet Bizerte *(9 series N° 25)* 'La Reine Blanche' *E55 of Exploration Flight E5.* Aluminium *(overall aluminum) on the upper surfaces,* noir *(black) on the underside of the hull and floats.*





Breguet 521 Bizerte.



Breguet 530 *Saigon*

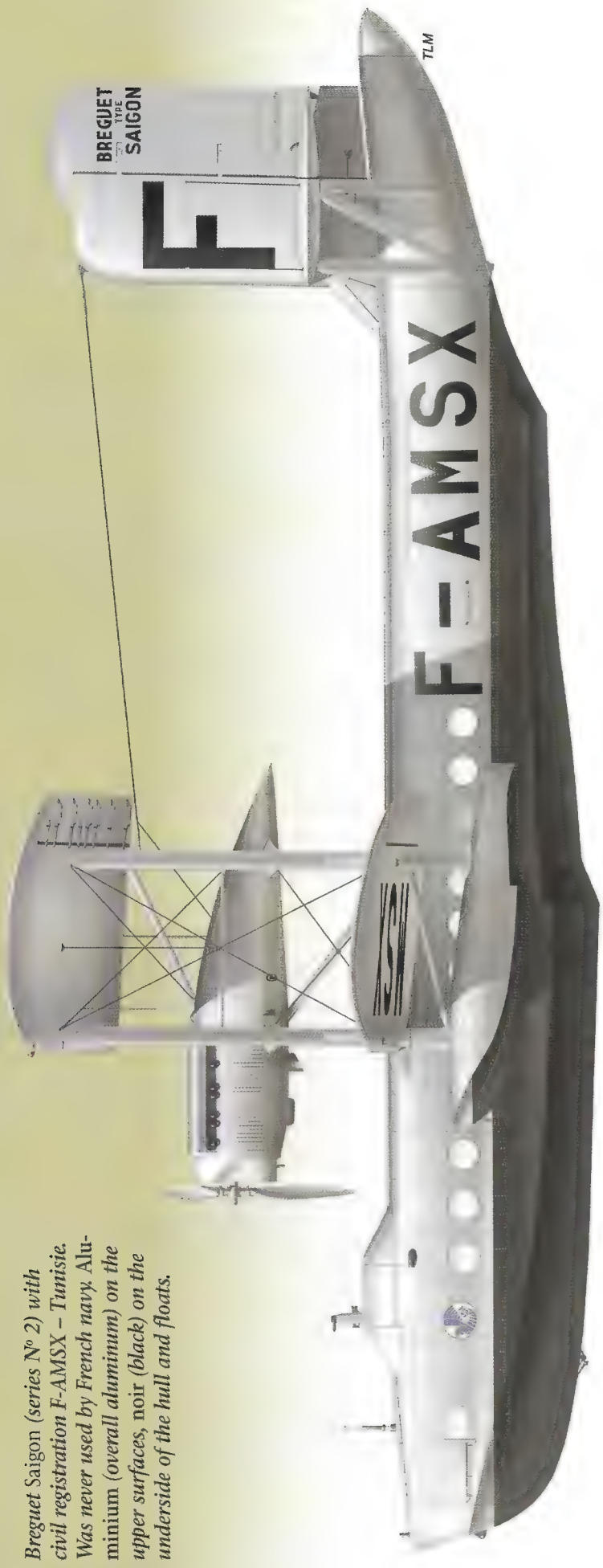
The Breguet 530 *Saigon* was the commercial version of the *Bizerte*. It met a requirement of the airline *Air Union* which ordered two of these aircraft during 1931.

Like its military counterpart, this flying boat was derived from the Short *Calcutta*. Basically, the design of the Breguet *Saigon* was that of the prototype *Bizerte* 'initial version' without the long forward 'glass house' mounted in series production aircraft. The main differences were the outfitting of the interior to carry passengers and the three engines, which were liquid cooled 890 hp Hispano-Suiza 12 Ydrs 2. A model of the *Saigon* was displayed on the Breguet stand at the 1932 *Salon de l'Aéronautique.*

The prototype, registered F-AMSV, was built at the Vélizy-Villacoublay factory and named *Algérie.* It made its first flight at Le Havre at the beginning of May 1932. On 22 May, it was at the CEPA at Saint-Raphaël to begin its C.D.N. tests under the supervision of the Reporting Officer, *Lieutenant de Vaisseau* Flamant. The test programme showed the need for hull reinforcement, subsequently applied also to the prototype Breguet *Bizerte*. At the same time, *Saigon* N° 2, named *Tunisie* and registered F-AMSX, was being tested at Le Havre before being taken on charge by *Air France* on 18 December 1934, a week before the prototype. The two aircraft were operated as from 1935 on the Marseilles-Algier service without major incident until N° 1 was withdrawn in 1938 after 1,000 flying hours. As from 1935, the Air Ministry had envisaged requisition of the two Breguet *Saigons* by the Navy in the event of war. Logically, this should have been the case at the outbreak of hostilities on 3 September 1939.

According to the mobilisation plan, the two aircraft should have been incorporated into Exploration Flight 12E. This solution was quickly abandoned as the two Breguet *Saigons* would first have to be considerably modified to take machine gun positions, particularly in the aft hull. In addition, the Admiralty had meanwhile earmarked Flight E12, then being formed, to incorporate

Breguet Saigon *N° 1, F-AMSV* Algérie *of Air France at Le Havre in 1934.*



Breguet Saigon *(series N° 2) with civil registration F-AMSX – Tunisie. Was never used by French navy.* Aluminium *(overall aluminum) on the upper surfaces,* noir *(black) on the underside of the hull and floats.*

the two large requisitioned LATE 521 and 522 flying boats. To begin with, only the prototype *Saigon*, F-AMSV, was taken on by the *Aéronautique Navale*. It was flight tested and on 7 September 1939, moved from Berre to Marignane by a crew commanded by *Capitaine de Corvette* Domengé, officer in charge of the naval seaplane base.

The service entry of N° 2, F-AMSX, had to wait until 29 December 1939 when it was handed over to the Navy at Berre *'without engines, propellers, wireless equipment and instruments'*. At this point, the hull also showed signs of corrosion. The aircraft had been withdrawn from service on 22 August for this reason after 1,448 flying hours. The aircraft could evidently not be used in this condition and could only serve as a source of spare parts. The creation of an autonomous exploration Flight comprising these two flying boats was thus seriously compromised.

Given its limited operational potential, the prototype Breguet *Saigon* was thus allocated to the 'Berre training section', poorly equipped with CAMS 37.1 and FBA 17 flying boats.

Wearing the hull marking BE-10 of the Berre base, its role was largely limited to liaison flights, mainly between its base at Berre and Aspretto in Corsica. It often carried high ranking personalities such as the local *Aéronautique Navale* commander at the end of January 1940 or the *Vice Amiral*, maritime *Préfet* of the 3rd region in March.

On the 7th and 8th June 1940, Breguet *Saigon* BE-10 nevertheless made two very long (7hr 30 and 6hr 50) top secret flights following a defined circuit between Berre and Saint-Mandrier, passing over Marseilles and along the coast of Provence. These involved 'electromagnetic detection tests' prior to the service entry of the naval look-out station on the Ile de Port-Cros.

These tests, which also involved magnetic field measurement on board the flying boat, were considered as 'highly satisfactory' by the commander of the Port-Cros station[1].

1. Little known beyond a limited group of specialists, the Navy had secretly set up a prototype radar system for detecting aircraft with the aim of protecting the Provence channel between Corsica and the mainland based on 'electromagnetic detection barrages'. These would identify any passage of aircraft flying above 800 metres and passing between an emission station and a reception point. These reception posts were all land based. The emission posts could be on land, like that on the Ile de Port-Cros, or at sea. According to certain sources, a patrol vessel and a submarine were already fitted with this equipment in May 1940

Breguet Saigon *N° 2, F-AMSX* Tunisie, *requisitioned but never used by the Navy.*

Breguet Saigon *(series (N° 1) BE-10 (formely F-AMSV* – Algérie*) seen at Berre Navy Station (1940). A FBA 17 is seen in the foreground.*

Breguet Saigon *N° 1 requisitioned by the Navy at the end of 1939 (Berre Training Section).*

Breguet Saigon *N° 1, F-AMSV, flying over the docks at Le Havre.*

Breguet Saigon *N° 1, formerly F-AMSV, seen at Berre in 1940. It was given the code BE-10, scarcely visible here on the hull.*

It would appear that the aircraft never flew again after 11 June when it returned to Berre from Saint-Mandrier.

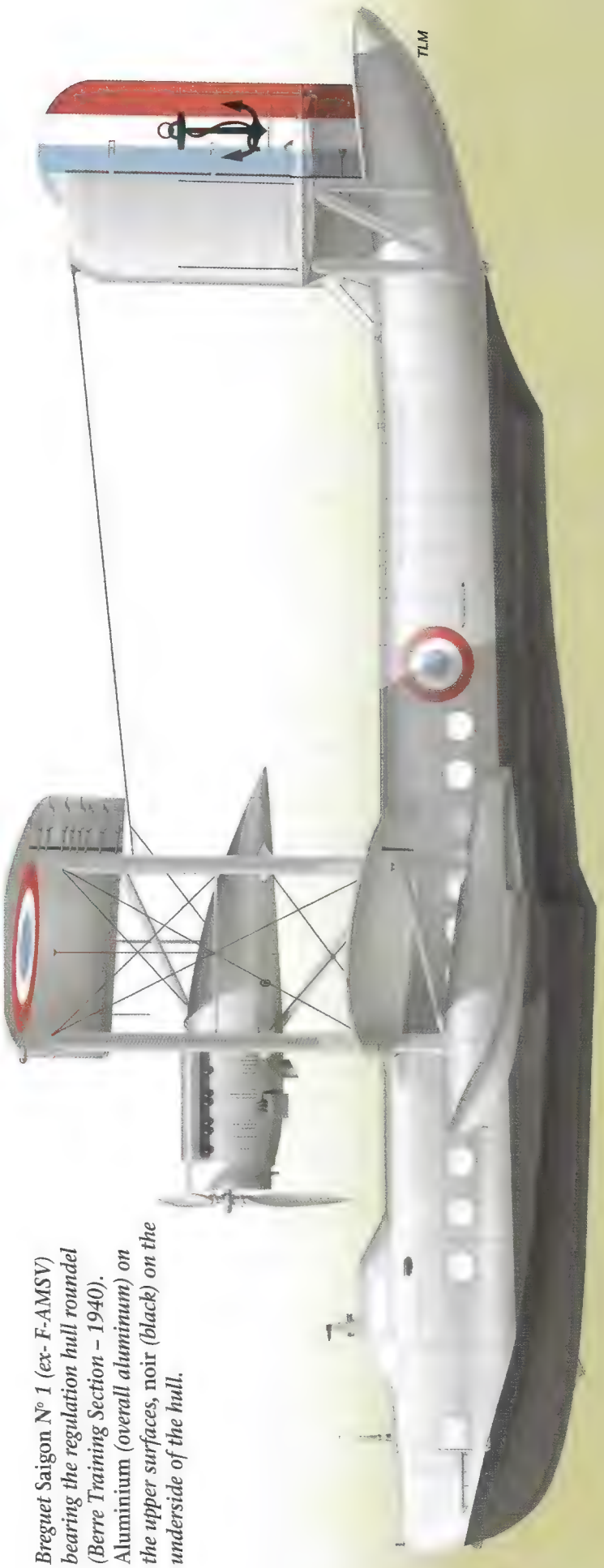
After the Armistice and the dissolution of its unit, the Breguet *Saigon* remained stored at Berre at the beginning of July 1940 along with other aircraft condemned to an uncertain fate. On 21 August, the Italian Armistice Commission indicated to the French Admiralty that the fifty or so aircraft used for training or as hacks (including 21 seaplanes, among them the Breguet *Saigon*) were forbidden to fly. The matter was left there until the following year.

On 4 October 1941, *Contre-Amiral* Marzin, Deputy Chief of Staff of French Naval Forces declared that a dozen naval aircraft being stocked at Karouba and in the south of France would be struck off charge. The Breguet *Saigon*, stocked at Berre, was on this list. Its scrapping brought to an end its short *Aéronatique Navale* career which had been relatively unimportant, mostly being devoted to liaison and training. But its involvement in the highly secret development of a 'French developed radar', though it came too late, was quite exceptional both in technical and military terms.

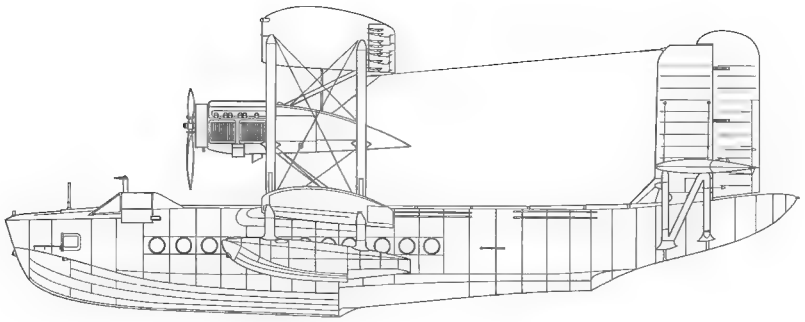
Civil Programme Civil Contract (1931)
Manufactured: 2
In *Aéronautique Navale* Service: 1
Unit: Berre Training Section (1939 – 1940)

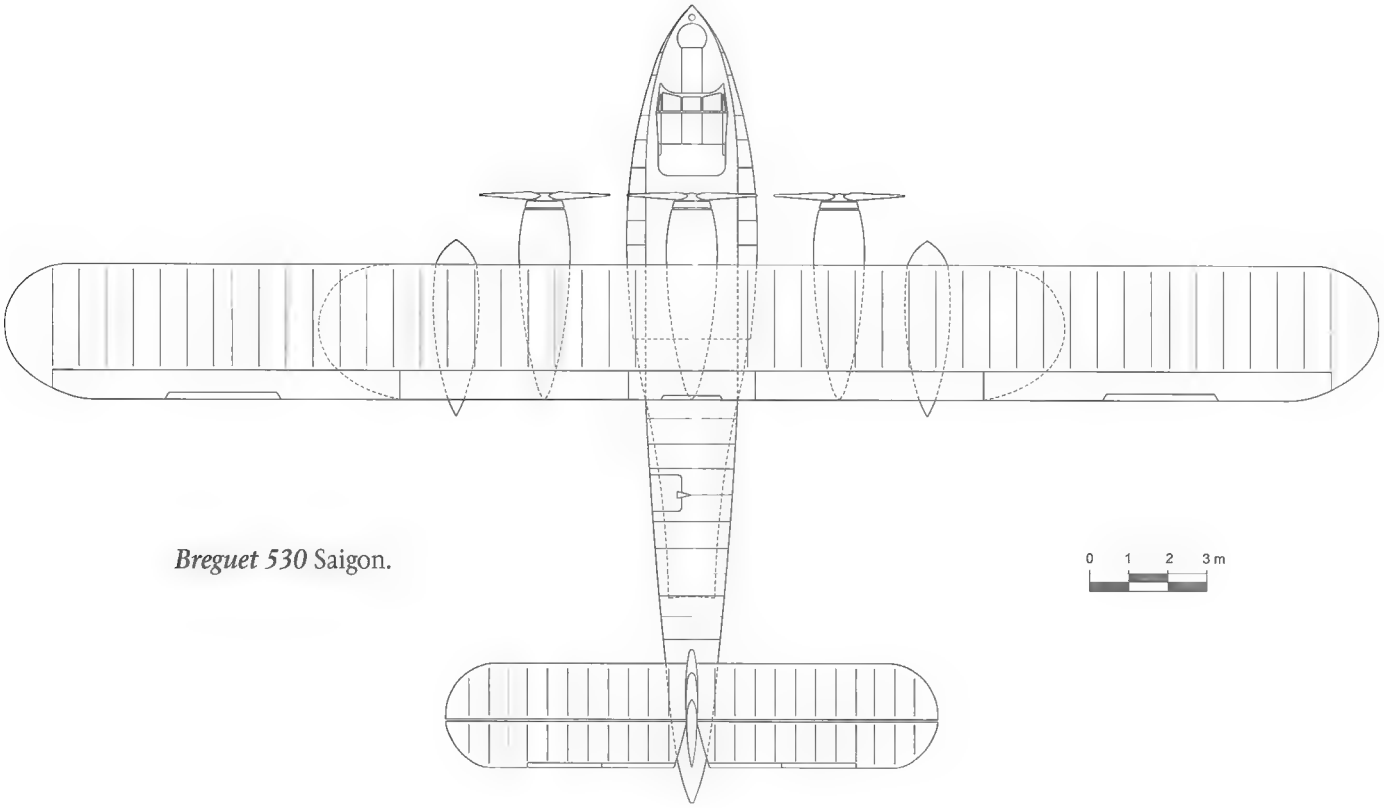
Given Names: Breguet 530 N° 1 (F-AMSV Algérie) later BE10, Breguet 530 N° 2 (F-AMSX Tunisie).

General Characteristics:
Three-engine metal sesqui-plane flying boat
Engines: 3 x 890 hp Hispano-Suiza 12 Ydrs 2
Propellers: 3-bladed Hispano-Suiza 17M
(3.50 m/11.48 ft)
Length: 20.33 m (66.7 ft)
Span: 35.13 m (115.25 ft) / lower wing: 23.17 m (76.01 ft)
Wing Area: 169 m² (1819 sq ft)
Height: 7.48 m (24,54 ft)
Empty Weight: 9,777 kg (21,555 lb)
Laden Weight: 14,400 kg (31,745 lb)
Maximum Speed: 240 km/h (149 mph)
Cruising Speed: 190 km/h (118 mph)
Range: 1,000 km (621 miles)
Crew: 3 (civil version)
Defensive Armament: None
Offensive Armament: None

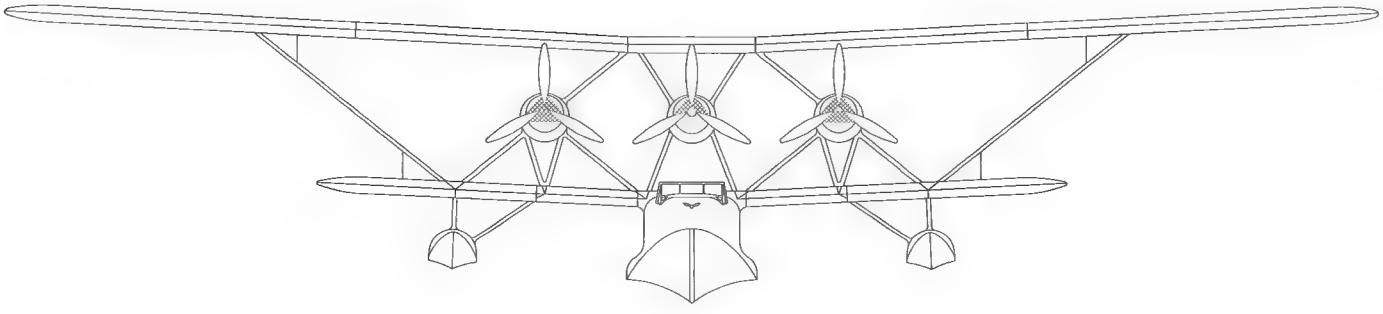


Breguet Saigon *N° 1 (ex- F-AMSV) bearing the regulation hull roundel (Berre Training Section - 1940). Aluminium (overall aluminum) on the upper surfaces, noir (black) on the underside of the hull.*





Breguet 530 Saigon.



Breguet 730 *Cherbourg*

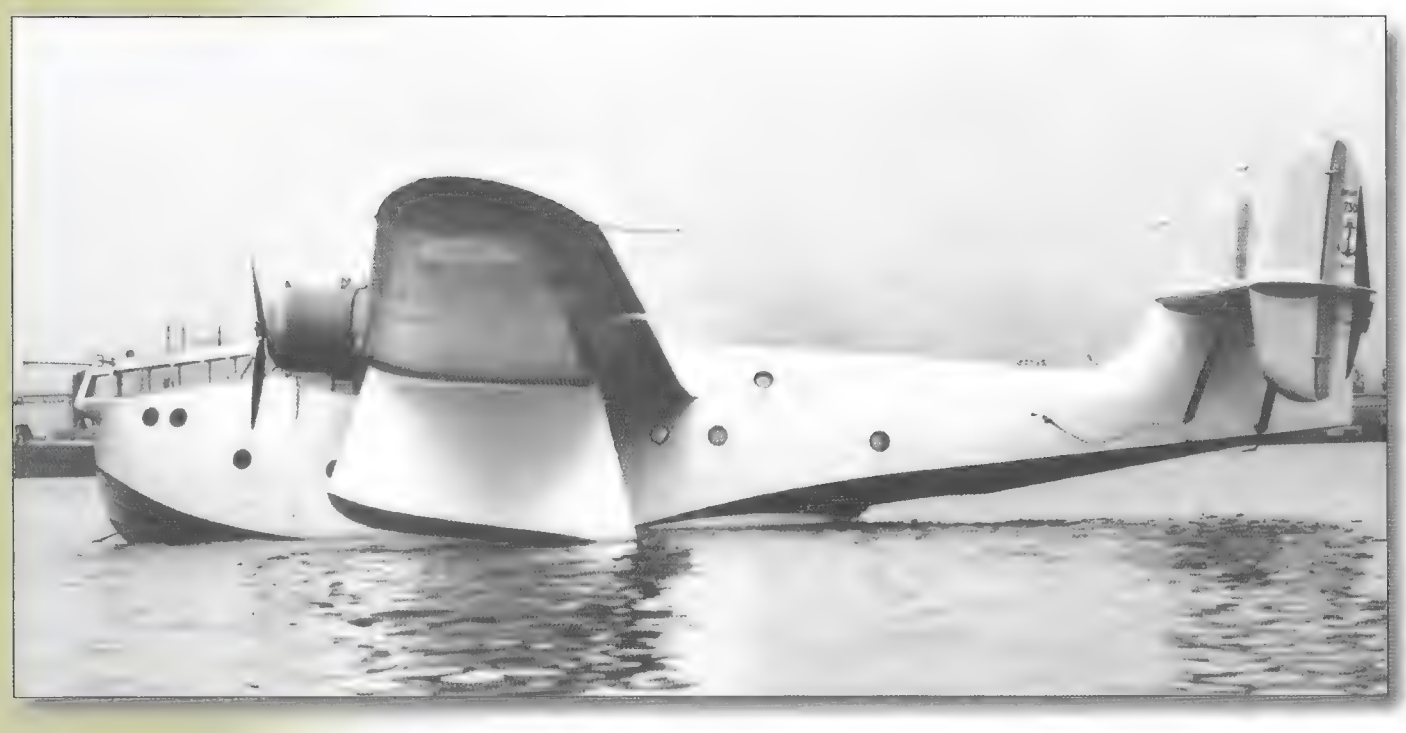
The Breguet 730 is a special case in this volume. Even though it had flown before the Second World War and could not be considered as a 'paper aeroplane', it played no role during 1939 – 1940. But in view of its important place in the evolution of French military seaplanes of the period, it cannot go without mention.

Technical Programme Origins

The Breguet 730 corresponded to the requirements of technical programme MP/C.P.T.10 of 1st May 1935 describing a 'Cruiser seaplane' (Class E) but its specification was based on naval note N° 100 AMG/Aéro/M of 20 February of the same year, itself in turn developed from an initial study concerning a 'Cruiser seaplane' dated 19 October 1933[1]. The length of this gestation process is an indicator of the seriousness with which the Admiralty approached this requirement for an aircraft whose mission would be *'protection on the high seas'*. By 1935, it had become necessary to envisage not only the replacement of flying boats such as the Breguet *Bizerte* and Loire 70, approved by the CEPANA on 4 November 1932, but also the more recently ordered Latécoère 302. In terms of performance requirements, the bar had been placed relatively high for the manufacturers since they were asked to prepare a four-engine seaplane of 20 to 25 tonnes with a crew of eight and being capable of flying for 30 hours in an overload condition at 150 km/h, equivalent to a range of at least 4,500 km in still air. The maximum speed required was 300 km/h. Armament was to consist of a forward-firing cannon, *'total defensive capability provided by multiple firing positions'* and the capacity to carry four 75 kg bombs. Take-off was to be ensured in waves of up to 1.25 m, higher than the usual requirement. Surprisingly, the *Armée de l'Air* was also envisaged as a potential user to ensure 'Empire liaison' and to *'support the defence of an overseas possession' (sic.)*. Along with the Breguet 790, the design of which began in September 1935, the projects of three other manufacturers were retained out of the total of eight contestants.These were the Latécoère 610 (future 611 *Achernar*), CAMS 141 (future Potez-CAMS 141 *Antarès*) and LeO 440 (later abandoned).

Breguet 730 N° 01 in the Cherbourg roadstead in 1938.

1. The 'Cruiser' class, which covered 'long range cruising', but also 'exploration' was always designated 'Class E' and never 'C', which corresponded to the fighter ('*Chasse*') designation in the Navy's technical programmes.



Breguet 730 N° 01 in Le Havre port.

History

Manufactured at the SNCAN (ex-Atelier Breguet) factory at Pointe du Hoc at Le Havre, the prototype Breguet 730 was first launched on 29 March 1938. This was followed by a twenty minute first test flight on 1st April in the hands of the well-known factory pilot Yves Lantz and *C. de F.* Protche on board as naval observer following testing of prototype 'Cruiser' seaplanes. Five days later, the Breguet 730 was transferred to Cherbourg to continue its test flights.

On 16 July 1938, after at least fifteen flights, the aircraft was practically destroyed when it crashed at the water's edge when alighting on the Cherbourg roadstead. The pilot, *Lieutenant de Vaisseau de Reserve* René Maret and *Maître Radio* Alain Le Gall were killed in this terrible accident. As the technical enquiry into the accident showed no fault in the aircraft's concept, the Navy continued to maintain strong interest in this maritime patrol flying boat. In January 1939, the Admiralty ordered four additional Breguet 730s and five more in July, all of which were to be delivered in the second half of 1940.

However, it was not possible to set up the production line for these aircraft at Le Havre since the factory no longer belonged to the Breguet group, which had lost most of its means of production due to nationalisations, but to SNCAN. In any case, the Le Havre factory was exclusively reserved for manufacture of the Breguet *Bizerte* and the Potez-CAMS 141 already on order. In February 1939 the wings from the wrecked prototype were stored at the Breguet factory at Vélizy-Villacoublay and the fuselage and ground handling trolley at Cherbourg. These were consequently transferred to the Latécoère factory at Toulouse-Montaudran, soon to be bought by Breguet. In November, in an effort to extend the range of 'Cruiser' flying boats, the Navy decided not to fit the Breguet 730 and the forthcoming CAMS 141 with torpedo launching equipment and 25mm cannon, these being replaced by twin Darne machine guns. However, work suffered from delays due to failure to supply raw materials such as duralumin. By the time of the Armistice, only four hulls were nearing completion at the Toulouse-Montaudran factory.

In April 1941, following discussions with the German authorities on developing a common programme of aircraft construction, the latter requested the French side to restart series production of the Breguet 730 which had been interrupted in 1940. In justification of this decision, the French authorities argued that because of the sale of eight Breguet *Bizertes* to Germany in August 1940, the *Aéronautique Navale* was now short of equipment. In October 1941, the Germans finally approved the manufacture of twelve of these aircraft at Toulouse and the assembly of the first

example to be delivered from that factory began in the Breguet workshops at Berre in the early part of July 1942.

This first example was, in effect, a reconstruction based on a new hull and that part of the wing saved from the damaged prototype, thus being quicker to build. It was intended, like the following aircraft, to be allocated to Exploration Flight 9E based at Berre, equipped at that time with Breguet *Bizertes* and one LeO 246. However, the process of construction dragged on due to failure to deliver enough Gnome & Rhône engines since the first four, initially intended for the Breguet 730, were ceded to SNCASE at Toulouse.

In March 1943, the designation Breguet 730 was officially chosen by the Secretariat of State for Air. From then on, the type was to be known as *Cherbourg*[2]. At the end of October 1943, the prototype was still at Berre, completed and ready to fly but it had not taken to the air by the time of the Liberation.

It was found in these conditions at Berre at the end of August 1944, miraculously intact under the wreckage of its hangar which retreating German troops had destroyed using explosives. In November, it was allocated to Transport Flight 9 F.T.R. On 20 December 1944, still at Berre, it finally made its first flight in the hands of the highly experienced pilot Jean Gonord, formerly of Latécoère. Baptised *Véga*, Breguet 730 N° 1 began its career in February 1945 with Flight 30S (ex 9 F.T.R.) at Saint-Mandrier, continuing afterwards with 33S in 1946 before being withdrawn from service in October 1949.

Thus, more than six years had elapsed between its fatal flight in 1938 and its effective service entry with the Navy in 1945, a record for slowness which could not be attributed in any way to its manufacturer.

The fate of the other Breguet 730 hulls at Toulouse was somewhat different to that of the 'cannibalised' prototype. The RAF bombed the Toulouse factory on the night of 5 – 6 April 1944, destroying eight of the remaining eleven Breguet 730 hulls. The enemy evacuated Toulouse in August and the three remaining hulls which had survived the attack were completed under government contract after the war. They served as the basis for one Breguet 730 (N° 2 in the series) identical to the prototype and two Breguet 731s which were redesigned to have a more aerodynamic bow with a more glassed in area and more powerful engines.

2. In its note N° 3271 DTI/C of 26 March 1943, the Secretariat of State for Air detailed the designations to be given to French manufactured aircraft and engines. For example, the 'obligatory names' (sic) to be given to aircraft manufactured by SNCASE, SNCASO and also Breguet were to begin respectively with the letters A, B and C. Thus, the Breguet 500, 730 and 1011 became Colmar, Cherbourg and Capricorne. The Potez-CAMS 161 (SNCAN) was thus baptised Picardie.

Marignane 1942. Breguet 730 N° 01 completely rebuilt after its accident and painted in Vichy colours.

Breguet 730 N° 01 Cherbourg (Marignane – 1942). Gris bleu foncé *(grey blue)* on the upper surfaces, gris bleu clair *(light grey blue)* on the under surfaces. On tail *(yellow-red)* Vichy markings.

The Biarritz-Anglet factory built the outer wings and floats for the last three Breguet 730/731s which were finally completed at Biscarrosse, from where Breguet 730 N° 2 first flew on 14 June 1946, Breguet 731 N° 1 on 2 September 1947 and Breguet 731 N° 2 on 22 March 1949 in the hands of test pilot Jean Prévost. After each being given its 'distinctive name', they were allocated to Flight 33S at Saint-Mandrier where their careers were relatively short. Breguet 730 N° 2 *Sirius* was destroyed in an accident at Port-Lyautey on 27 June 1951 (seven killed), Breguet 731 N° 2 *Altair* was struck off in August 1953 and 731 N° 1 *Bellatrix* was withdrawn from service in January 1954, ending up as an instructional airframe at the Rochefort base before being scrapped 'in situ'.

Air Ministry Contracts:

N° 1087/6 of 1936 (Order for one prototype Breguet 730 N° 01), N° 591/9 of 5/4/39 (Order for four Breguet 730), N° 2061/9 of 19/10/39 (Order for five Breguet 730), N° 141/45 of 19/6/45 (Order for three Breguet 730/731).

Manufactured: Four (N° 01, damaged, became N° 1).

In *Aéronautique Navale* Service: Four (1945 – 1954).

Units: 30S, 33S.

Distinctive Names:

Breguet 730 N° 01 *Cherbourg* (never worn).

Breguet 730 N° 1 *Véga.*

Breguet 730 N° 2 *Sirius.*

Breguet 731 N° 1 *Bellatrix*

Breguet 731 N° 2 *Altair.*

Breguet 730 N° 01 (damaged prototype)

General Characteristics:

Four-engine metal hull flying boat.

Engines: 4 x 1,050 hp Gnome & Rhône 14N2/N3

Propellers: Three-bladed Ratier with pitch variable in flight.

Length: 24.19 m (79.36 ft)

Span: 40.36 m (132,41 ft)

Height: 8.11 m (26,6 ft)

Empty Weight: 14,430 kg (31,813 lb)

Laden Weight: 27,750 kg (61,178 lb)

Maximum Speed: 325 km/h at 1,500m (202 mph at 4921 ft)

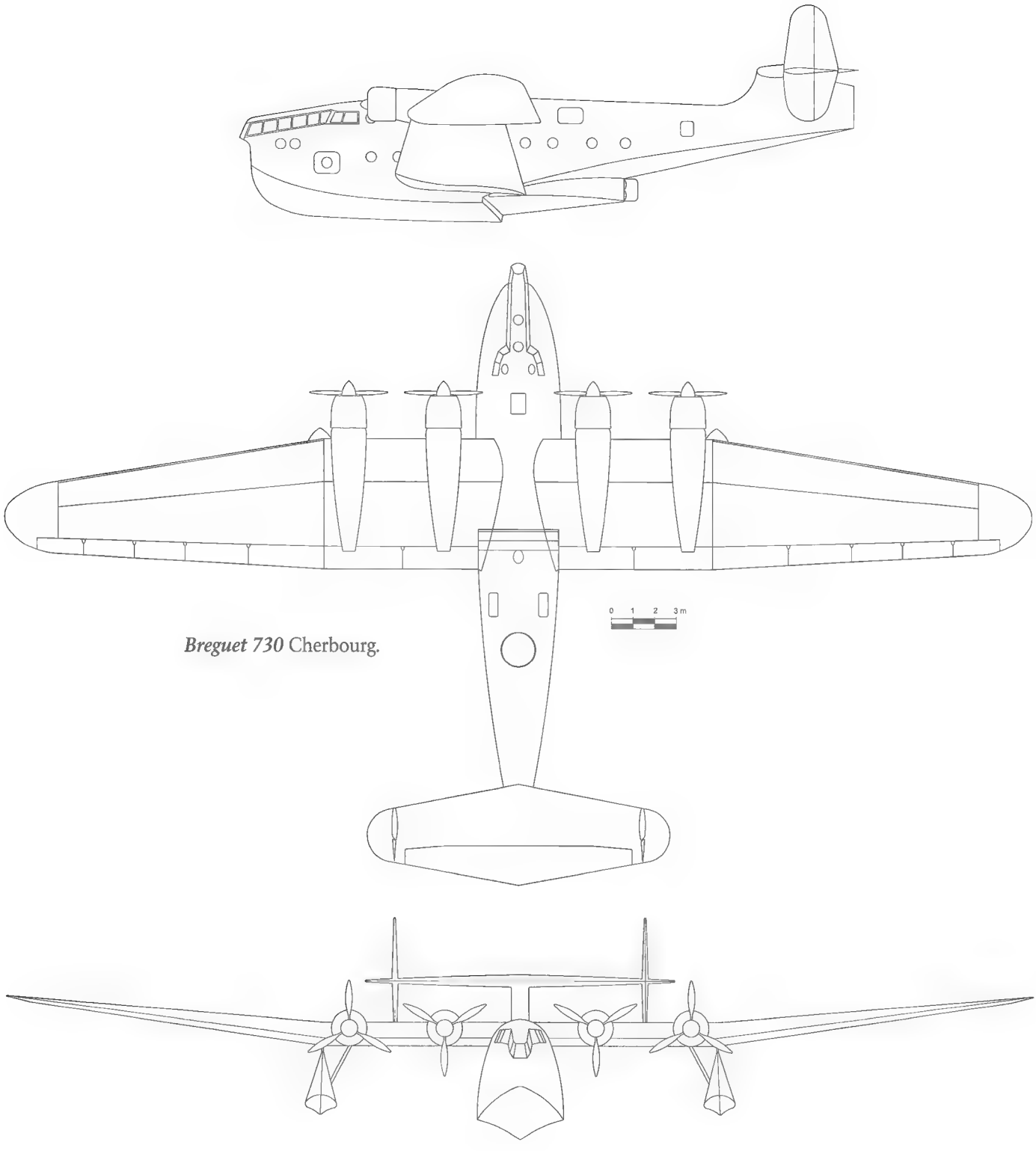
Cruising Speed: 180 km/h (112 mph)

Climb Time: 13 minutes to 2,000m (6562 ft)

Range: 4,500 km (2796 miles), Crew: 10

Defensive Armament: 6 x Darne 7.5 mm machine guns, 1 x 25 mm cannon (not fitted).

Offensive Armament: 4 x 75 kg (165 lb) bombs (not fitted).



Breguet 730 Cherbourg.

Breguet 790 *Nautilus*

Technical Programme Origins

The design of the Breguet 790 was in response to technical programme A46 drawn up in 1938, but extrapolated from the general programme for naval equipment on 8 March 1937 (Circular N° 306 EMG/Aéro) which set out the basic outline. The requirement was for 'a coastal patrol seaplane', not ship based (Class S), capable of serving in daytime or at night, with semi-dive bombing capability (45 degrees from 250 to 600 m) and suitable for conversion training with seaplane schools.

The aircraft was to have a crew of three on wartime operations and four, three being pupils, when on training flights. It could also be single or twin engine and be of floatplane or flying boat configuration with weight between 4 and 5 tonnes, maximum speed in excess of 250 km/h and endurance of six hours when flying at 150 km/h. Its armament was to consist of two machine guns and two 75 kg bombs. The aim was to gradually replace the CAMS 55, Gourdou 810 and LeO 43 emanating from the 1933 programme. The competing proposals adopted by the CEPANA were the SE-10 (future SE 400), the Potez-SNCAN 180 and the Breguet 790, two of which were ordered[1].

The design of the Breguet 790 was already finalised in September 1937, based on the characteristics set out in the programme drawn up in March. The initial wind-tunnel model was tested in October 1937.

The aircraft was by now known as the Breguet 790 S-3, powered by a Gnome & Rhône 14 Mars engine developing 650 hp at sea level. Another version, the 791, powered by a Hispano-Suiza 12 Xbr of equivalent power, was also envisaged. In February 1938, the Air Ministry's materials committee was asking for urgent manufacture of prototypes for the *Armée de l'Air*, but also for the *Aéronautique Navale*, particularly of the two observation seaplanes SE-10 and Breguet 790.

A few months later, *Amiral* Lacroix of the Naval General Staff pointed out the immediate need to place an order for 25 Breguet 790s. However, nobody knew where to build them with the Le

1. The history of the SE-400 and Potez-SNCAN 180 will be dealt with later on in this collection.

Towing the Breguet 790 prototype during its tests. The Latécoère factory at Biscarrosse can be seen in the background with Latécoère 298s awaiting delivery.

Breguet 790 N° 1 at the Biscarrosse factory in 1939. (Musée de l'Hydraviation).

Havre factory being fully occupied with the Breguet *Bizerte* production line. In August, the same technical committee recommended dividing production between two sites with 20 aircraft to be manufactured at Le Havre and five at the Toulon Arsenal. On 21 September, the Navy, considering that *'the Breguet 790 was not too expensive'*,[2] finally ordered 35 of the aircraft, 25 to be built at Le Havre and 10 at Toulon. At this point, the Navy decided to go one better, offering the possibility of ordering 100 of the aircraft during the same month!

By the end of 1938, wind tunnel tests had led to the abandonment of the initial twin rudder design in favour of a single rudder with two small additional vertical stabilisers fitted to the horizontal tail plane. In March 1939, the Navy envisaged that in 1941 there would be 55 Breguet 790s and SE 400s (ex SE.10) equipping five flights.

On 20 April, the Naval Construction Directorate at Toulon was ordered to prepare to increase its manufacturing order for the Breguet 790 from 10 to 15 aircraft, to be delivered as from January 1941, thus increasing the total order to 40. Then, on the following 28 July, the Navy passed an order for 60 aircraft followed by Contract 2059/9 signed on 19 October 1939.

When the War began in September 1939, the Air Ministry signed an agreement with Breguet (Order 2N-24) confirming the delivery of 60 aircraft at the rate of six per month as from March 1940, bringing the total to 75 Breguet 790, excluding the two prototypes.

In a note to the Air Ministry, the Ministry for the Navy noted that the delivery of Breguet 790 and SE 400 aircraft had become a matter of 'great urgency' and that testing them had to be 'actively pursued' in view of the deficiencies of coastal patrol flights in terms of 'numbers and quality'.

However, manufacture of the two prototypes ordered from Breguet, finally under construction at the Vélizy-Villacoublay factory, had become subject to delays arising from slow deliveries of raw materials, a recurring problem at the time.

Thus, by February 1939, work on the prototype was only three-quarters finished and its completion was now slated for March, a programme which was not respected. As a result, the schedule for series production of the aircraft was heavily compromised. The Navy expressed its bitter disappointment to the Air Ministry in mid-September 1939 in the terms: *'the deficit of this class of seaplane in the face of present operational requirements (anti-submarine warfare) is making this problem*

2. The price of a Breguet 790 was 1,800,000 Francs, considerably higher than that of the much older CAMS 55/2 (1,350,000 Francs) and equivalent to that of a LATE 298 (2 million Francs).

The prototype Breguet 790 being built at the Breguet factory at Vélizy-Villacoublay. (Musée de l'Hydraviation).

very serious'. The Admiralty then asked that '*for the moment, all production efforts should be devoted to the Loire 130*', which had already been in series production before the war.

The prototype Breguet 790 was finally ready in September 1939 and was flight tested at Biscarrosse by the Breguet test pilot André Lenoble. The aircraft was recorded as arriving at Hourtin on 3 February 1940. Six days later it was transferred to Saint-Raphaël for CEPA evaluation.

However, on 22 February, it was seriously damaged. While the engine was being run up on the ground, the aircraft fell off its immobilising chocks. It was then dismantled and sent back to the manufacturer for repairs. On 15 April 1940, Brogue 790 N° 2 arrived at Saint-Raphaël from Biscarrosse via Hourtin. Twelve reception test flights were made, ten by Lenoble and two by *Lieutenant de Vaisseau* Husson of the CEPA. During these tests, the aircraft exhibited longitudinal instability aft of the c.g. and considerable problems with air intake admission. In addition, when hydroplaning, the windscreen was partly obscured in heavy seas at the slightest choppy wave[3].

As a result, the CEPA demanded that these defects be corrected with minimal delay. On 18 May, N° 2 was transferred to Biscarrosse along with three other prototypes under test at Saint-Raphaël (NC-410, Bloch 480 and Loire-Nieuport

The Breguet 790 prototype taking off from the Biscarrosse lake. (Musée de l'Hydraviation).

3. Very curiously, no document has been found attributing the name *Nautilus* to this aircraft, though it has been mentioned by several post-war authors. In the absence of such a document, the attribution of the name should be treated with due caution. Nevertheless, we have adopted it, since it is well known to specialists. Perhaps Breguet staff adopted it as a joke given the Breguet 790's tendency to partly disappear in the waves during testing like 'a submarine navigating on the surface' And if this were so, why the reference to Jules Verne's famous *Nautilus*? The mystery remains.

L.N.10) since that base had to be evacuated and its aircraft put in a more secure place.

Two days earlier, the Navy Minister, writing to his Ministry of Air counterpart, complained about the technical shortcomings of the Breguet 790 in damning terms: '*this seaplane seems to be a failure. After eight months of testing by the manufacturer, the Test Centre at Saint-Raphaël has found it unacceptable in its present form.*

The Technical Service considers that its defects can be remedied, so I do not object to modifications. However, it is not clear when it will finally be ready, so I ask you to slow down the rate of production of those aircraft under construction and to transfer most of the workforce employed on it to other types.'

On 25 May 1940, *Contre Amiral* Lartigue, Service Chief of the *Aéronautique Navale*, took a radical decision concerning this aircraft which had drawn much criticism up to that point and, above all, had led to much ink flowing between the various ministries. He decided to limit series manufacture to the number of Breguet 790s actually under construction, thus cancelling the 60 aircraft involved in Contract 2059/9. Similar measures were also taken concerning the 15 aircraft ordered from the Toulon Arsenal. Nevertheless, construction of the prototype was to continue '*while sticking to the basics*'.

But by that time, the Germans had already been overrunning France for fifteen days and it is not difficult to imagine why these orders were not immediately carried out.

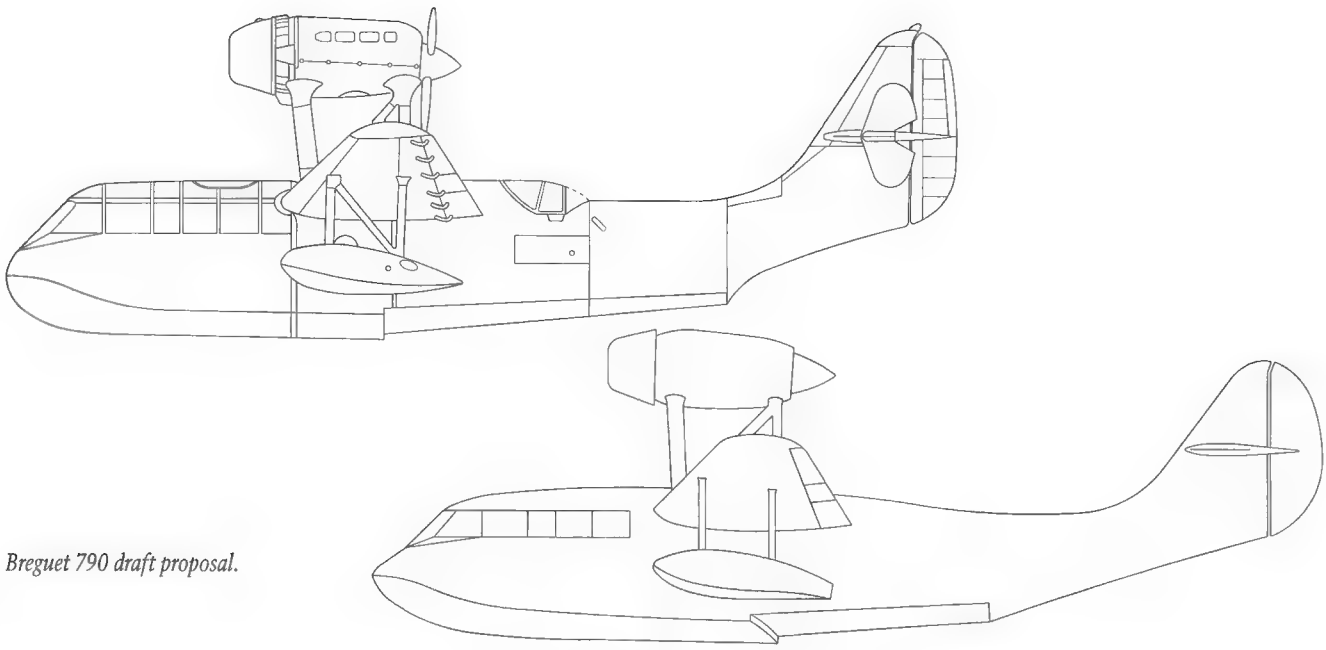
The ultimate fate of Breguet 790 N° 1 is uncertain. It was probably seized by the Germans at the Vélizy-Villacoublay factory. N° 2 was certainly flown for the last time at Biscarrosse on 27 May 1940 by a CEPA representative who was testing the effect of a hull modification, moving the step further aft, and the aircraft's semi-dive bombing capabilities[4]. The aircraft was discovered and seized by Germans troops at the Latécoère Biscarrosse factory in June 1940 (see photo page 85). Beyond that point, there is no further trace of this aircraft.

Breguet 790 prototype (Biscarrosse – 1939).
Aluminium (overall aluminum) on all surfaces.

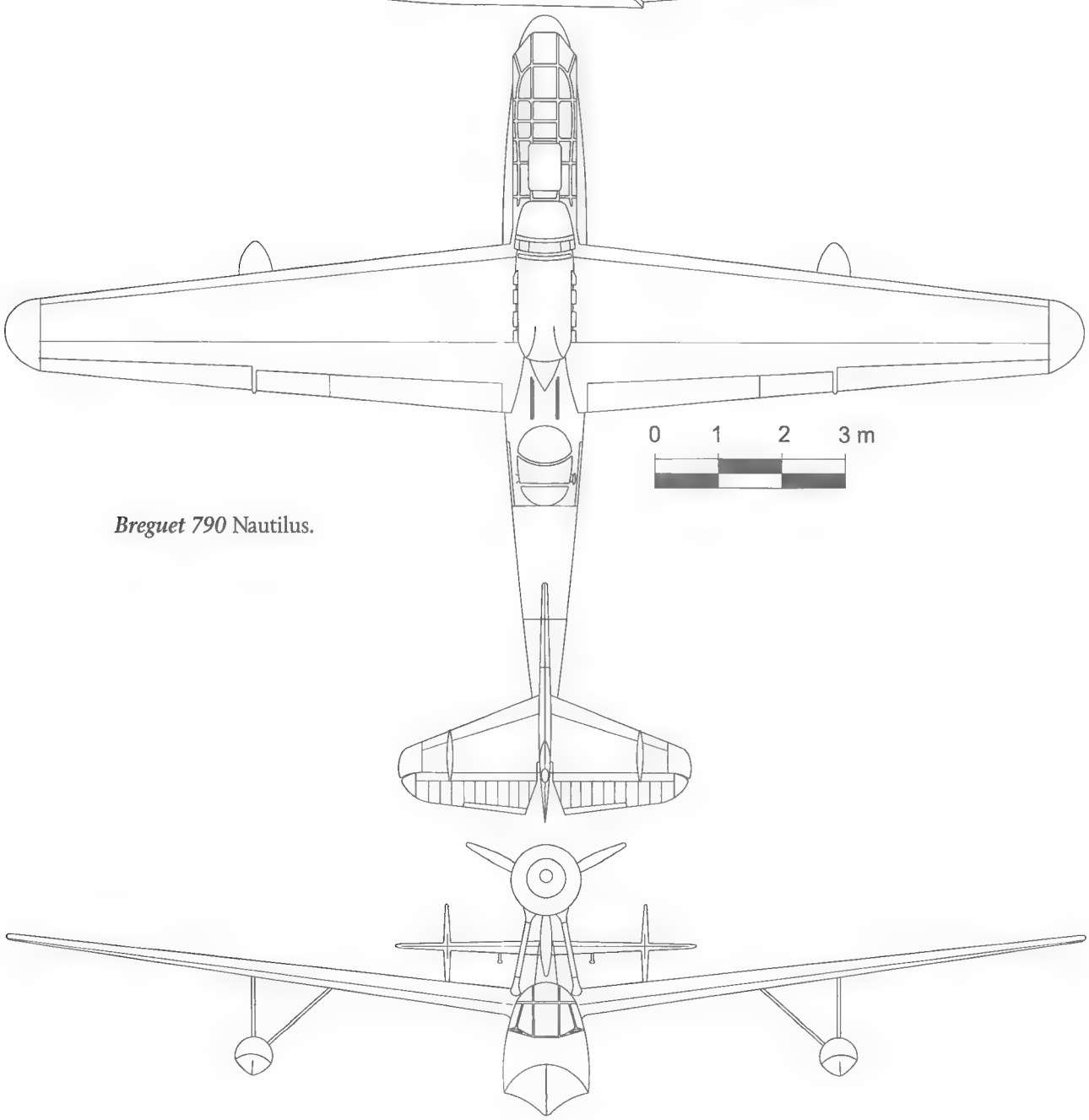
4. As a means of limiting speed when diving at 45 degrees, the Breguet 790 was fitted with braking flaps known as 'crocodiles' which opened simultaneously above and below the wing surface so as to eliminate any torsion. These were fitted to the wing in a way which, according to the Breguet design office, 'avoid any turbulence which might hit the tail planes'.

***Aéronautique Navale* Orders and Air Ministry Contracts.**
Contract N° 377/8 (Order for two Breguet 790).
D.M.1535 EMG/Aéro/M of 21/9/38 (Naval order for 35 Breguet 790).
D.M.791 EMG/Aéro/M of 20/4/39 (Naval order for 15 Breguet 790).
Contract N° 865/9 of 1939 (Order for 15 Breguet 790, cancelled and replaced by Contract N° 2059/9).
Contract N° 2059/9 of 19/10/39 (Order for 60 Breguet 790).
Manufactured: Two.
In *Aéronautique Navale* Service: None (Testing of two aircraft by the CEPA).
General Characteristics:
Metal hulled single-engine flying boat
Engine: 650 hp Hispano-Suiza Xirs 1.
Propeller: Three bladed Ratier type 1675 (3m/9.8 ft diameter).
Length: 12.64 m (41.47 ft)
Span: 17 m (55.77 ft)
Wing Area: 33 m² (355 sq ft)
Height: 4.03 m (13.22 ft)
Empty Weight: 2,665 kg (5,875 lb)
Laden Weight: 3,400 kg (7,496 lb)
Maximum Speed: 303 km/h at 1,500m (188mph at 4921 ft)
Cruising Speed: 100 km/h (62 mph)
Touch Down Speed: 85 km/h (53 mph)
Ceiling:6,000 m (19,685 ft)
Take-off Time: 20 seconds.
Crew: Three
Defensive Armament: One dorsal 7.7 mm. (.303) Lewis machine gun.
Offensive Armament: Two 75 kg (165 lb) G2 bombs.

The Breguet 790 prototype undergoing maintenance at Biscarrosse in 1939. A Latécoère 298 can be seen in the background. (Musée de l'Hydraviation)



Breguet 790 draft proposal.



Breguet 790 Nautilus.

Breguet 792

Technical Programme Origin

The Breguet 792 was a twin-engined version of the 790. It was developed in response to technical programme A62 which asked for a 'Heavy ship-borne reconnaissance seaplane' (Class S.B) drawn up on 18 August 1938. This programme was an updated version of an earlier requirement set out in naval note N° 306 EMG/Aéro/M issued on 8 March 1937. The requirement was for a three-place aircraft capable of use with a catapult of 3.4 tonnes maximum power. The aircraft was intended to replace the Loire 130 embarked on naval vessels. The wings had to be capable of being folded. According to the specification, the aircraft could be single or twin-engine, capable of carrying out reconnaissance to protect the surface fleet, smoke-screen laying, fire control and semi-dive attacks with 75 kg bombs.

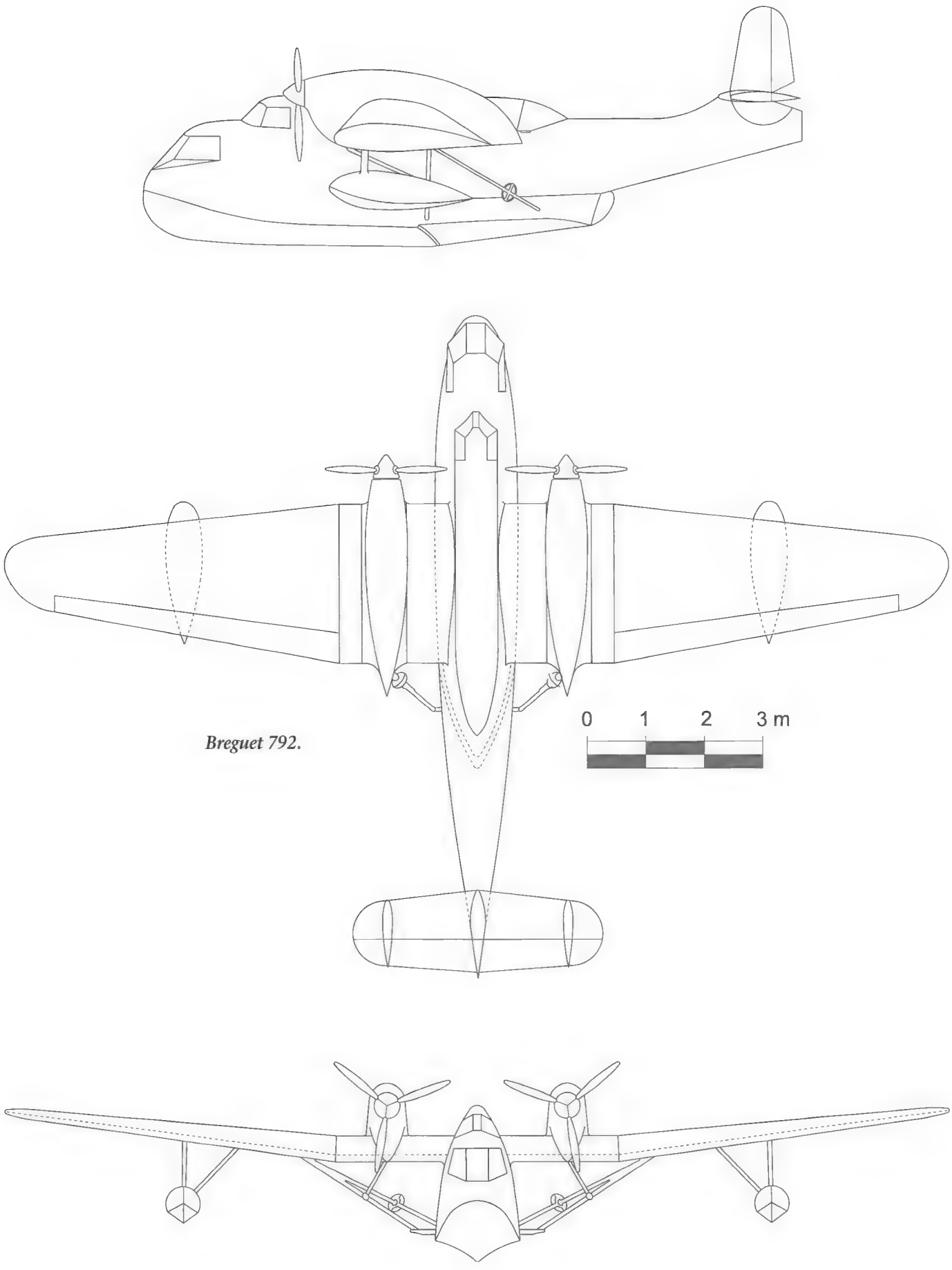
The Navy and the Air Ministry engaged in much beating about the bush concerning the content of this programme. Thus, in December 1937, *Contre-Amiral* Lacroix informed the *'technical service and manufacturing supervision'* that the A62 programme had failed to respect the size limitations requested by the Navy. At the same time, extension of the length was asked for. Then, in July 1938, the Admiralty reduced the flight duration requirement by one hour so that the manufacturers would find it easier to conform to a need for twin-engine seaplanes (either float planes or flying boats) *'much more suitable for use as observation aircraft than single-engine floatplanes'* (the only category considered up till then in view of existing technical requirements). In August 1938, the Navy finally decided on those aspects of technical programme A62 concerning the aircraft's dimensions and autonomy. Three prototypes were retained by the CEPANA: the Breguet 792 and its two main competitors, also twin-engine, the SNCAC/NC-420 and the Gourdou 130.

History

As usual, the design offices of those manufacturers interested in the project were completely messed up by the various modifications introduced into the technical programme.

Breguet ended up proposing a twin-engine flying boat 'Type 792' which corresponded to the Navy's requirement and was awarded a government contract for two prototypes in 1938.

Photograph of the Breguet 792 wind-tunnel model. Note that, with the exception of the engine positions, the form is identical to the Breguet 790.



Breguet 792.

The 792 was a simple derivative of the 790 to such an extent that the wind tunnel model tested at Issy-les-Moulineaux in October and November 1938 used the wing and fuselage of the Breguet 790. On 6 June 1939, the mock-up of the Breguet 792 was examined by naval representatives at the Vélizy-Villacoublay factory while its direct competitor, the NC-420, was seen at Billancourt the next day. The layout of the mock-up of the 792 was officially approved on 24 August 1939. In September, *Contre-Amiral* Michelier asked that the completion of the NC-420 and the Breguet 792, now considered as being of *'secondary importance'* in terms of prototypes to be completed, be *'carried out as quickly as the design offices and the manufacturers are capable'*. But by the beginning of 1940, preparation of the 792, initially intended for delivery in August and now allocated to the Toulouse-Montaudran factory, had still not begun according to an Air Ministry report. This was also at the time when Breguet was also having the greatest difficulty in completing tests of the first two 790s within a reasonable time.

The Armistice intervened and matters rested there, with the Breguet 792 becoming just another *'paper aeroplane'*. As will be seen, its competitor, the NC-420, had no better luck.

Air Ministry Contract
N° 1945/8 of 1938 (Order for two Breguet 792).
Manufactured: 0 (Project).
General Characteristics:
Twin-engine all-metal catapultable flying boat with folding wings.
Length: 11.265 m (3695 ft)
Span: 16 m (52.49 ft) [4.75 m (15.58 ft) with wings folded]
Height: 3.65 m (11.97 ft)
Engines: 2 x 360 hp Bearn 6D
Laden Weight: 3.45 tonnes (7606 lb)
Maximum Speed: 300 km/h (186 mph) at 1,500 m (4921 ft)
Range: 5 hours [at 150 km/h (93 mph), catapult launched].
Armament: 2 x Darne machine guns, 2 x 75 kg (165 lb) G2 bombs

CAMS 37

Technical Programme Origin

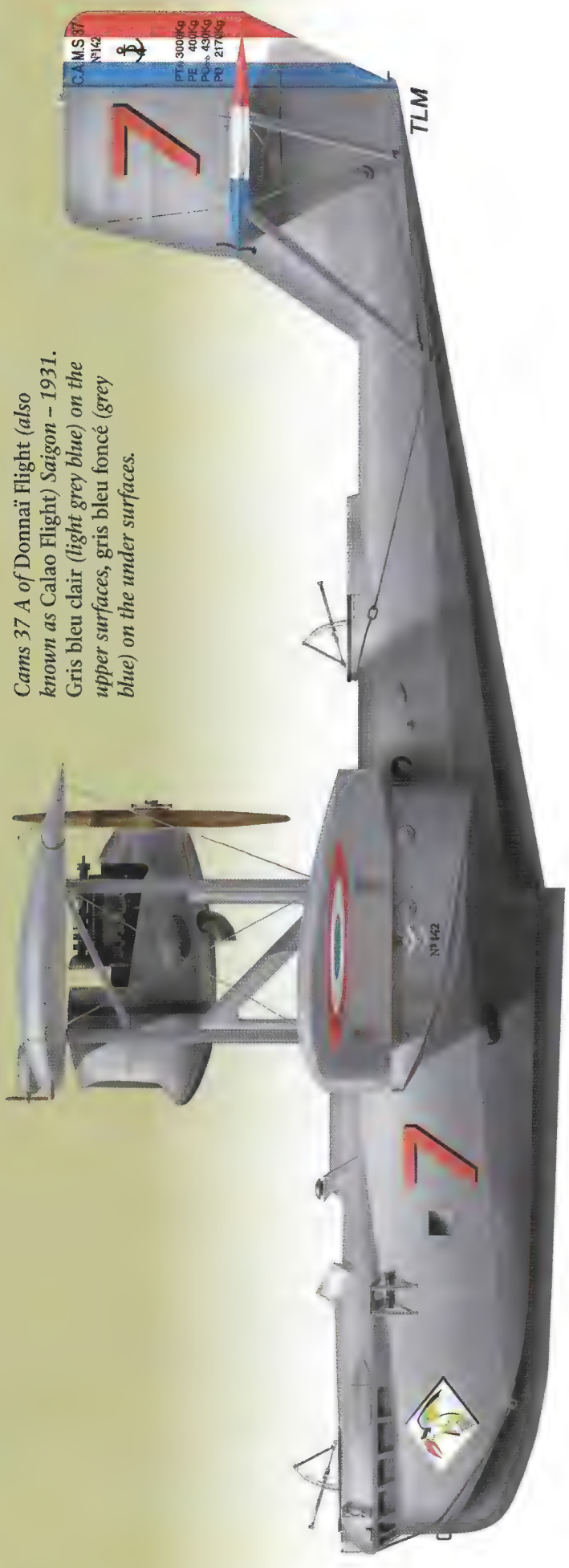
In 1924, the CAMS company (acronym *for Chantiers Aéro-Maritimes de la Seine*) proposed to the naval aviation authorities, who had been looking for such an aircraft for some time, an amphibious flying boat suitable for carrying aboard warships. The result was the CAMS 32, powered by a 180 hp engine and with folding wings, but during tests by the Navy, the aircraft was considered to be too heavy. Learning a lesson from this semi-failure, the manufacturer developed the CAMS 37[1]. This was a wooden hulled single engine biplane flying boat corresponding to naval technical programme (Note N° 857 Aéro-2M) of 17 June 1924 in the category 'Observation and Reconnaissance' Class III and type 03, also referred to as 'R3b': that is to say *'a three-place Observation amphibian capable of shipboard use'*. The specification called for a single or twin-engined aircraft with folding wings, capable of flying for four hours at a cruising speed of 160 km/h and being able to climb to 3,000 metres in 25 minutes. *'Amphibious capability was desirable'* but not an obligation. Maximum weight was to be no more than 2.5 tonnes to allow the aircraft to be catapulted using existing equipment. The manufacturers proved in no hurry to fulfil these exacting requirements.

At the time, the Navy implicitly admitted the difficulty of the task: *'given the very difficult conditions imposed by maximum weight, dimensions required for on board use and also resulting from difficult requirements concerning fixtures and fittings, only the CAMS company agreed to comply. After three years work, the result is nevertheless excellent'*. In 1928, the 'Observation and Reconnaissance' category was renamed 'Class S', for *'Surveillance'*.

Two examples of the CAMS 37 were ordered in 1924. The prototype, numbered 001, was a pure flying boat. It flew at Sartrouville at the beginning of 1926 before being flown to the CEPA at Saint-Raphaël by Maurice Hurel in February and given that base's characteristic code S.10. It was armed with a machine gun which was tested by *Lieutenant de Vaisseau* Boulleau in August 1926.

1. The CAMS 37 was the first project to be produced at CAMS by the highly talented engineer Maurice Hurel, who became Technical Director, holding that position up until World War 2 and supervising the design of some twenty different types of seaplane.

A new CAMS 37.2 fresh out of the Sartrouville factory (450 hp Lorraine engine).



Cams 37 A of Donnaï Flight *(also known as* Calao Flight*) Saigon – 1931.* Gris bleu clair *(light grey blue) on the upper surfaces,* gris bleu foncé *(grey blue) on the under surfaces.*

N° 002, sometimes referred to as the 'CAMS 37*bis*' in certain documents, was the first to bear the suffix A (for Amphibian) on its nose. It was completed during the summer of 1926 and tested at the CEPA before the end of the year. The first Amphibian in this series was fitted with a removable retractable undercarriage and was powered by a Lorraine 450 hp engine, compared with a Hispano-Suiza for the prototype. The *Aéronautique Maritime* technical bulletin for the second half of 1926 indicated that *'the c.g position and flying qualities of the CAMS 37 A need to be improved compared with the first prototype'*, though the land undercarriage worked satisfactorily. But it was soon realised that, fully laden, the Amphibian weighed 2.8 tonnes when fitted with its retractable undercarriage, thus exceeding the capabilities of catapults in service. Following a campaign of tests flights with the prototype on board the warship *Bretagne*, an initial order was placed with CAMS for 15 Amphibians in 1927. 70 more were ordered in 1928. During 1929, land catapult tests were carried out at Saint-Nazaire using a Penhoët catapult. At the same time, the manufacturer was developing other versions:

The Type 37 C Amphibian with a closed cabin, better known under the '*Lia*' (for Liaison) designation, the 'G.R.' (*Grande Raid*) version and, finally, the four-place 37/11 or 'E' (*Ecole*) for naval conversion training.

The first unit to be equipped with the CAMS 37 was Flight 4S1 at Karouba (Tunisia) in the second half of 1928. In unit service, it became quickly apparent that the landing gear, which could be lifted but not entirely retracted, reduced the aircraft's performance both as a result of its drag and dead weight, a problem which had already been noted during tests at the CEPA. This is why the CAMS 37, with the exception of the '*Lia*' version, was mostly used as a pure flying boat, without the undercarriage.

The sailors didn't much like the '*Lia*' version, considering it to be underpowered, lacking in range and needing frequent adjustments to its undercarriage. It was sometimes used in its '*VIP*' version as personal transport by some admirals. CAMS *Lia* N° 5, which made its maiden flight on 27 February 1930, was built with a duralumin metal hull, receiving the designation *'Type 37/9'*. Even the 70 kg loss of weight

CAMS Sartrouville factory (near Paris) where the CAMS 37 was built (1938).

A line-up of four-place training CAMS 37E at the Hourtin base before the war (code HT).

CAMS 37/11 (also known as CAMS 37 E), (series N° 22) of Surveillance Flight 8S5. Papeete 1940. Gris bleu clair *(light grey blue) on the upper surfaces,* noir *(black) on the underside of the hull.*

compared with the wooden hulled variant did not ensure its success and it remained the only one of its kind after testing by the CEPA in July-August 1931. By May 1932, the little CAMS biplane had become the *Aviation Maritime*'s standard seaplane.

By that time, 72 of the type were in service (48 type 'A', 3 type 'E' and 21 '*Lia*' version) not counting the 54 aircraft awaiting delivery. It then equipped three 'combat' formations, 2S1 at Berre, 3S1 at Hyères and the already mentioned 4S1, as well as most naval training sections and for hack duties. The Navy stated its '*complete satisfaction*' with the CAMS 37E for training, stating that it was '*the ideal aircraft for transition from the FBA to medium weight flying boats*'.

By February 1936, 100 of these aircraft were in service. But three years later, in January 1939, only 20 were still operational since a number of them had been struck off due to age during 1938, being gradually replaced on patrol duties by the more modern CAMS 55 twin-engine biplane flying boat. Since its service entry with the Navy, the different versions of the CAMS 37 had served as the standard seaplane for training and liaison duties but also on the aircraft carrier *Béarn*, the seaplane tender *Commandant Teste* (Flight 7B2) and on the training cruiser *Jeanne d'Arc*. It was also embarked on board the cruisers *Duquesne, Tourville, Waldeck Rousseau* and *Edgar Quinet*, where the absence of a catapult made it necessary to put the aircraft into the water using a swinging boom crane.

It was also to be found with two units far from metropolitan France, the first being Flight E8 based at Papeete in French Polynesia which had just one CAMS 37E. The second was created in 1931 at Saigon-Cat-Laï on the Donnaï river. This unit, most commonly known as the 'Calao Flight', was equipped with CAMS 37A and '*Lia*'. Quite surprisingly, in August 1933, the naval base at Cat-Laï was transferred to the *Armée de l'Air,* which set up the '5th Indochina Flight' there while keeping on the complement of CAMS 37 flying boats. This peculiar unit ended up being equipped with eight CAMS 37A and two '*Lia*' painted in white livery as opposed to the blue-grey they wore in the Navy. Thus, of the 31 CAMS 37 manufactured in 1938, the

CAMS 37A N° 78, coded BR.43 (Brest-Poulmic Training Section). Gris bleu foncé *(grey blue) on all surfaces.*

CAMS 37A coded 2S1.5 of Surveillance Flight 2S1 at Brest-Laninon. Note the 75 kg. G2 bomb in position under the wing.

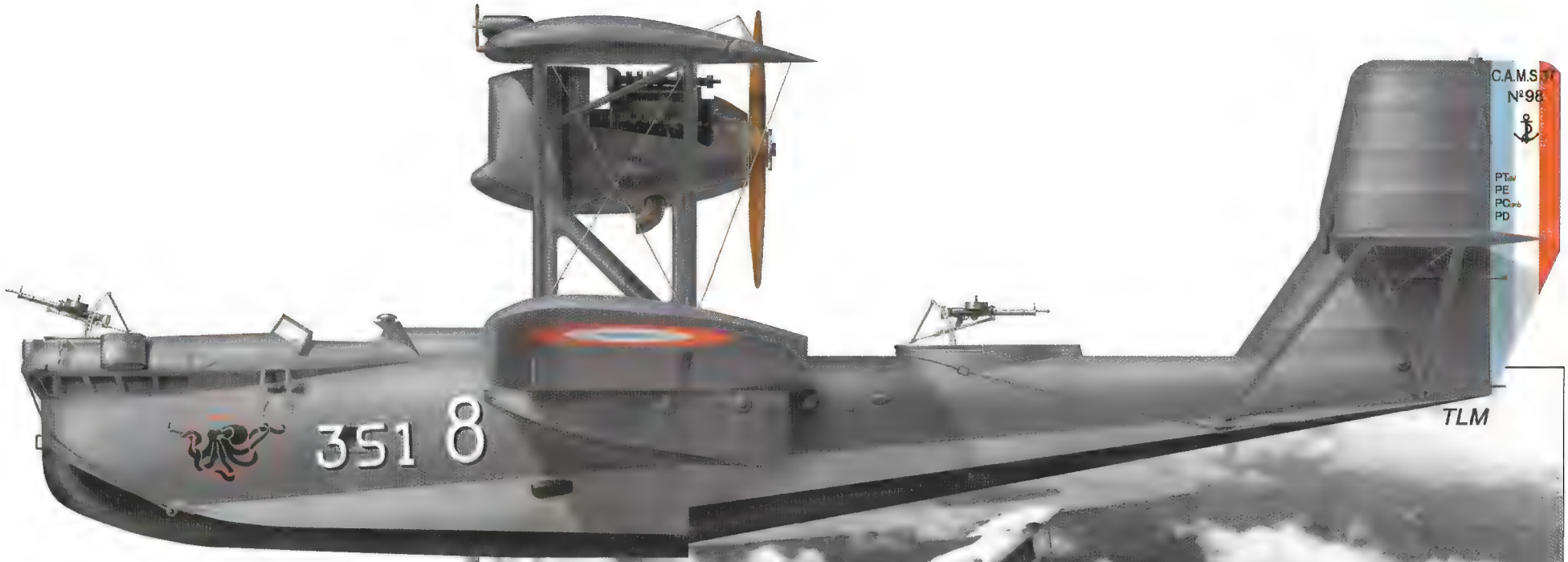
CAMS 37 N° 001, code S-10, seen during testing at the CEPA, Saint-Raphaël. Note that the engine position and the rudder design differ from the series product.

Armée de l'Air found itself receiving 17 Type 37/11 flying boats and the Navy 14 others in the 37E version.

In February and March 1939, the last ten CAMS 37/11 left the SNCAN production line at Sartrouville. This delivery marked the completion of the contract for ten aircraft placed in 1938 and marked the end of production of close to 300 of this remarkable little military flying boat which represented a fine industrial success for the CAMS company and especially for its pilot and designer Maurice Hurel[2].

On the declaration of war on 3 September 1939, the *Aéronautique Navale* still had around sixty CAMS 37s, many of which were not immediately mobilised. The type was allocated to four operational units, officially designated as *'Auxiliary'* and formed at the beginning of the conflict from *'training sections or schools'*. These units were 1S2 (Cherbourg), 2S2 (St.Trojan and Saint-Nazaire), 2S4 (Lorient), without overlooking 5S1 (future 8S5) based at Papeete in French Polynesia. The total strength of these four units at the start of the war, and intended to carry out monotonous coastal patrol missions using outdated seaplanes, was no more than ten CAMS 37/11. This flying boat was also present in training, liaison and other sections at Cherbourg, Lanvéoc-Poulmic, Hourtin, Rochefort, Hyères, Berre, Saint-Mandrier, Aspretto and Karouba (Tunisia). Even though largely outdated in September 1939, the CAMS 37 nevertheless continued to interest the Admiralty, particularly because of the need to compensate for the lack of coastal patrol seaplanes due to delays with newer types in progress (Breguet 790 and Loire 130). Thus, in October 1939, a series of 20 additional CAMS 37A, to be delivered between April and July 1940, was ordered from Potez by the Air Ministry. The Navy justified this decision on the grounds that the aircraft was *'of wooden construction and simple to build'* and that it still remained in service (23 CAMS 37/11 were still in use on training duties at Hourtin in March 1940).

2. As an anecdote, it is recounted that several commanders of units using the CAMS 37 sent postcards to Maurice Hurel, himself a former CEPA naval pilot, playing on the CAMS initials, such as 'Casse Au Moindre Saut' (Breaks at the first bound), to which Maurice Hurel had replied: 'Ceci Assure Mon Sarcophage' (This will serve as my tomb)!



CAMS 37A coded 3S1.8 (serial unknown) of Surveillance Flight 3S1 (Hyères – before the war). Gris bleu foncé *(grey blue) on the upper surfaces, gris bleu clair (light grey blue) on the mid part of the hull,* noir *(black) on the underside of the hull.*

Formation of CAMS 37A of Cochinchina Flight N° 5, operated by the Armée de l'Air.

CAMS 37 (Lia) *N° 1 used by* Amiral *Durand-Viel, Commander-in-Chief of the Mediterranean Fleet (1931).*

CAMS 37.9 (Lia), *the only aircraft of the series to have a metal hull (Saint-Raphaël – 1932).*

In January 1940, this latest order was formalised by a contract which added a further 30 CAMS 37 E to be delivered between June and September 1940, bringing the total to 50 to be manufactured. The work was transferred from Potez to SCAN de Port-Neuf *(Société de Constructions Aéro-Navales)* implanted at La Rochelle. Due to lack of engines for these aircraft, none of them were completed before the Armistice.

Finally, SCAN had to be content with overhauling a number of CAMS 37s in service, the last having been flown in to Hourtin two days before the arrival of the Germans!

After the cease-fire, 19 CAMS 37s were stored, on the decisions of the Occupying Powers, at Berre, Toulon, Karouba and Port-Lyautey, to await scrapping. But beyond metropolitan France there remained a lone CAMS in October 1940 with the former Flight 8S5/20S at Tahiti, a unit which had now joined the Free French. This aircraft was withdrawn from service in October 1940.

From September 1941 to November 1942, four of the aircraft were allocated, under the supervision of the Armistice Commission, to the flying school at Fréjus-Saint-Raphaël for training officer pilots. This final use of the aircraft under the Occupation marked the end of the career of the CAMS 37 with the *Aéronautique Navale*, with which this rustic but safe aircraft gave generations of sailors the opportunity of learning the basic elements of seaplane flying.

On a final note, Portugal took delivery of eight CAMS 37A, these serving with that country's naval aviation until 1935. They took part in putting down revolutionaries on the island of Madeira in 1931. It is noteworthy that the Portuguese authorities only placed their order after having visited all the European firms deemed capable of supplying similar aircraft (Supermarine, Macchi, Savoia, etc.).

The choice in favour of the CAMS 37 thus showed a certain advance on the part of France in the seaplane area. Finally, two civil CAMS 37/6 '*Lia*' were used on board the Compagnie Générale Transatlantique liner *Ile de France* during 1928 and three other CAMS 37Es were used at the Gnome & Rhône flying school at Saint-Chamas on the Berre lake from 1937 to 1941.

CAMS 37 Lia belonging to the commandant of Bearn's ship Flight (1928/30). **Gris bleu clair** ***(light grey blue) on the upper surfaces,*** **noir** ***(black) on the underside of the hull.***

TLM

CAMS 37A N° 80 of the Donnaï *Flight, also known as the* Calao *Flight due to its insignia. It was based at Cat-Laï, near Saigon in Indo-China.*

CAMS 37 (series N° 60) aboard Jeanne d'Arc, *damaged whilst being hoisted aboard in bad weather (1937).*

CAMS 37 Lia *used by the Commander of Air Forces of the 1st Maritime Region (CB indicating Cherbourg). It is shown here in front of the Amiot factory at Caudebec-en-Caux.*

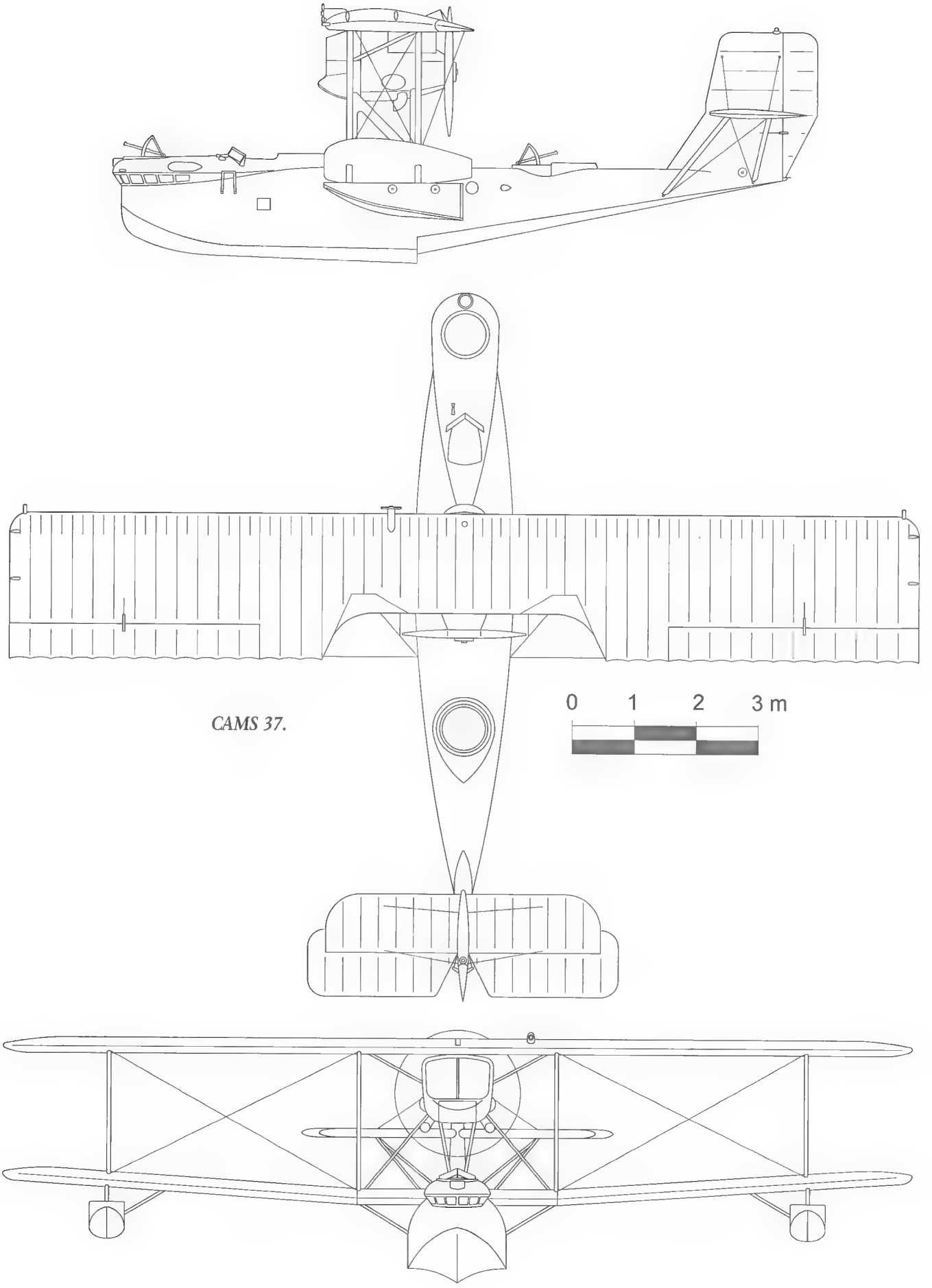
CAMS 37 E coded SR 62 (series N° 43). Training section in Saint-Raphaël (1941/42). Gris bleu clair *(light grey blue) on the upper surfaces,* noir *(black) on the underside of the hull. On tail (yellow-red) Vichy markings.*

CAMS 37E, series N° 43, coded SR62 and bearing Vichy markings, used for training at Saint-Raphaël. It was one of the last four CAMS 37 to serve with the Aéronautique Navale *before this type of flying boat was completely withdrawn in 1942.*

Confirmed Government Contracts
(list not exhaustive)
216/4 of 1924 (Order for 2 CAMS 37A).
1994/6 of 1927 (Order for 15 CAMS 37A).
1004/7 of 4/3/27 (Order for 15 CAMS 37A).
1109/9 of 12/12/29 (Order for 6 CAMS 37A)
333/1 of 31/7/31 (Order for 27 CAMS 37A).
346/5 of 30/9/35 (Order for 6 CAMS 37A)
1093/6 of 2/4/37 (Order for 10 CAMS 37/11).
592/7 of 1937 (Order for 10 CAMS 37/11).
1115/7 of 12/8/37 (Order for 17 CAMS 37/11).
32/8 of 21/12/37 (Order for 10 CAMS 37E).
895/8 of 1/8/38 (Order for 10 CAMS 37E).
2840/9 of 29/1/40 (Order for 20 CAMS 37E. Cancelled).
Manufactured: 291
Types Produced:
37 CAMS 37.6 (36 '*Lia*' and 1 '*Grand Raid*' to the Navy).
144 CAMS 37.2 ('A' to the Navy and the *Armeé de l'Air*).
110 CAMS 37.11 ('E' to the Navy).
In service with the Navy: 163
In service with the *Armée de l'Air:* 15
In service with the Portuguese Navy: 8
Units: (1928 – 1942)
Flights: 1S2, 2S1, 2S2, 3S1, 4R1/4S1, 7B2, E8, 5S1/8S5, CEPA, Training sections at Aspretto, Berre, Brest, Cherbourg, Hyères, Karouba, Orly, Port-Lyautey, Rochefort, Saint-Mandrier, Saint-Raphaël, Hourtin flying school.
On Naval warships: Cruisers *Duquesne, Edgar Quinet, Jeanne d'Arc, Tourville, Waldeck-Rousseau*, Aircraft Carrier *Béarn*, Aircraft tender *Commandant Teste*.
Other users: 5th Indochina Flight (*Armée de l'Air*), CAN (Portuguese Naval Aviation Centre).

General Characteristics:

Single-engine biplane flying boat of wooden construction			
Version	**37.2 (A) Surveillance**	**37.6 (C, Lia, G.R.) Liaison Amphibian**	**37.11 (E) Conversion Training**
Engine	450 hp Lorraine 12 Edr	450 hp Lorraine 12 Edr	450 hp Lorraine 12 Edr
Length	11.43 m (37.5 ft)	11.37 m (37.30 ft)	11.37 m (37.30 ft)
Span	14.50 m (47.57 ft)	14.50 m(47.57 ft)	14.50 m(47.57 ft)
Height	4.20 m (13.77 ft)	4.20 m(13.77 ft)	4.72 m (15.48 ft)
Wing Area	59.9 m² (645 sq ft)	59.9 m² (645 sq ft)	59.9 m² (645 sq ft)
Empty Weight	2,170 kg (4784 lb)	2,150 kg (4740 lb)	2,130 kg (4696 lb)
Laden Weight	3,000 kg (6614 lb)	3,000 kg (6614 lb)	3,000 kg (6614 lb)
Maximum Speed	175 km/h (109 mph) sea level	185 km/h (115 mph)	190 km/h (118 mph)
Alighting Speed	85 km/h (53 mph)	85 km/h (53 mph)	85 km/h (53 mph)
Take-off Time	16 sec	16 sec	16 sec
Climb Time	42 min to 3,000 m (9,842 ft)	27 min to 3,000 m (9,842 ft)	22 min to 3,000 m (9,842 ft)
Practical Ceiling	3,400 m (11,155 ft)	3,800 m (12,467 ft)	3,900 m (12,795 ft)
Range	800 km (497 miles)	850 km (528 miles)	800 km (497 miles)
Crew	3	4	4
Defensive Armament	2 x 7.7mm. (.303) Lewis	None	None
Offensive Armament	2 x G2 75 kg (165 lb) bombs	None	None



CAMS 37.

CAMS 55

Together with the CAMS 37, the CAMS 55 was among the most outstanding seaplanes used by the *Aéronautique Maritime* before the war, both in terms of its widespread use and its length of service. It was also one of the major technical and industrial successes generated by the CAMS design office, with more than a hundred of these aircraft entering service.

Surprisingly, it was not built in response to any particular technical programme. It was simply the result of application of a formula dear to CAMS, that of the central hulled biplane flying boat. It was nevertheless a direct derivative of the CAMS 51 R3 N° 001 (itself based on the CAMS 33 H.R.3), a coastal reconnaissance flying boat with folding wings and a crew of three (Type H.B.3) drawn up in conformity with a 1926 technical programme and which flew for the first time at Sartrouville in April 1926 piloted by Maurice Hurel.[1]

At the end of its evaluation by *Lieutenant de Vaisseau* Boulleau at the CEPA between the beginning of May and the end of July 1927, the Navy decided to adopt this type of *'reconnaissance seaplane'* since, in the terms of the commission, it showed *'a great advance over aircraft of this category at present in service'*.[2]

Nevertheless, the CEPA requested a few modifications (widening of the hull, modification of the step, improvement of the c.g., internal arrangements and in the wing folding system). But given the 'brilliant' conclusions of the test programme, a limited series of four CAMS 51s was rapidly ordered by the Navy in 1927.

This version was soon replaced in the contract by the CAMS 55, plans for which had begun in July 1927, having more powerful engines and a strengthened hull.

The four aircraft were constructed at the CAMS factory at Saint-Denis in the Paris region. The prototype of this new flying boat flew for the first time during the first half of 1928 at Sartrouville

1. Contrary to the view expressed by some authors, the CAMS 55 was not a direct derivative of the type 50 of 1926, which was initially a 'three place Coastal Reconnaissance amphibian flying boat' which had then become a 'torpedo launching flying boat', capable of being embarked on the aircraft tender *Commandant Teste*. Even though the CAMS 50 followed the same formula as the type 55 and was externally identical, the technical origin stopped there. It underwent testing at the beginning of 1929, after three years' delay to its initial programme, long after the prototype CAMS 55.
2. The CAMS 51 R3 was then sent to the training section at Cherbourg bearing the code G.18. From there it took part in a demonstration flight to Scandinavian countries in August 1927. Then it went onto the civil register as F-AIMZ in the name of the S.T.I.Aé in February 1928, being transferred to Senegal the following March, where it operated on the postal line Saint-Louis – Porto-Praia on behalf of the *Compagnie Générale Aéropostale*.

A fine view of CAMS 55.10s of Exploration Flight 1E1 at Cherbourg (1934 – 1935).

CAMS 55.1/H, series N° 9, with Hispano-Suiza engines. This aircraft is brand new and shown here at the CAMS factory at Sartrouville.

where the series was being built. It was then displayed on the CAMS stand at the 11th *Salon d'Aéronautique* in Paris in June-July of the same year.

In November 1928, the *Aéronautique Maritime* officially modified and simplified the classification system for aircraft and seaplanes. The CAMS 55 thus came under the category 'Exploration' and no longer 'Reconnaissance', as had been the case with its predecessor, the CAMS 51 'R3'.

At this point, the Admiralty had decided to put into service two new 'Exploration' seaplanes (CAMS 55 and Latham 47) and wished to compare them before placing an order for series production. As a result, the first two of each type were sent to the CEPA for comparative testing.

This turned out to be all the better since each of the four aircraft was equipped with a different type of engine, making possible a wide range of performance comparisons. The two Lathams were fitted with Renault or Farman engines. CAMS 55 N° 1 had inherited two 600 hp Hispano-Suiza 12 Lbr while N° 2 was fitted with two 480 hp Gnome & Rhône *Jupiter'9Akx* (in place of 380 hp

CAMS 55.2 N° 69, coded 4S1.3 of Surveillance Flight 4S1 based at Bizerta-Karouba, seen here off Galite Island.

CAMS 55/J, series N° 2, coded 3E1.4, moored on Berre Lake (Flight 3E1 – 1932).

CAMS 55/H, coded 3E2.2 of Exploration Flight 3E2 at Berre. The Latécoère 300 Croix du Sud *can be seen in the background.*

CAMS 55.10 N° 85, 2S1.1 of Surveillance Flight 2S1 at Lanvéoc-Poulmic.

on the CAMS 51). In view of this technical difference between the two aircraft, the manufacturer designated them CAMS 55 J for *Jupiter* and 'H' for *Hispano*, these becoming official designations for the two versions, in parallel with the basic types 55.1 and 55.2. The Lathams and the two CAMS 55 were delivered to Flight 3E.1 at Berre on an experimental basis in 1929.

CAMS 55 N° 1 participated in a round tour of Algeria with the French fleet in May, while N° 2 proceeded with tests with 3E1 from September 1929 to March 1930. This evaluation showed up a lack of solidity concerning the engine supports which were subject to destructive vibrations and were among the most fragile components in this type of seaplane. This defect was never entirely eliminated and led at the beginning of 1934 to a temporary suspension of unit flights by the CAMS 55/J for four months, the time required to solve the problem.

By contrast, the engines of the two versions were entirely satisfactory. Overall, the aircraft was consider to be *'agreeable to fly'*, but its marine qualities left something to be desired, notably on take-off, which was said to be difficult to master, a recurrent defect which would later lead to the loss of several CAMS 55s.

The mounting of the Hispano-Suiza engines on the aircraft appeared to be beneficial. While single-engine flight with the 55/J was practically impossible, the 55/H could continue in this way without difficulty. Also, with its considerable excess power, the CAMS 55/H took off much more quickly at an all-up weight of 7 tonnes than the 55/J with 500 kg less. This was why the 55/H was more frequently ordered than the 55/J.

Unfortunately, one CAMS 55 was lost during the testing period. On 12 November 1929, N° 4 ran out of fuel and made a forced ditching without injury to the crew. However, it sank while a torpedo-boat was trying to tow it.

In October 1930, *Contre-Amiral* Violette summed up the naval pilots' opinions of the CAMS 55 as follows: *'Good in the air. Too fragile on the water!'* Nevertheless, the following month, the Air Ministry announced a new contract, raising the number of CAMS ordered to 53, only about two years after its first flight!

On 18 March 1931, CAMS 55, N° 8 in the series, under the command of *L.V.* Bernard with three other crew on board, came down at sea

CAMS 55H of Exploration Flight 4E1 (Bizerte-Karouba) 1935. Gris bleu foncé *(grey blue) on the upper surfaces,* gris bleu clair *(light grey blue) on the under surfaces. Engine nacelles in natural metal.*

CAMS 55H of Surveillance Flight 8S5. Tahiti. Gris bleu foncé (grey blue) on the upper surfaces, gris bleu clair *(light grey blue) on the under surfaces. Engine nacelles in natural metal.*

as a result of fuel shortage to the east of Fuerte Ventura Island between Casablanca and Dakar. Remarkably, the distressed aircraft drifted for four days until the liner '*Touareg*' found it and its crew in good health to the north of Cape Juby. In May 1931, three aircraft of 3E1 at Berre left Cherbourg under the command of *L.V.* Nomy to participate in the International Aviation Exhibition near Stockholm in Sweden. This round trip of close to 4,300 kilometres via the Netherlands, Denmark, Sweden and Poland, with certain legs involving non-stop flights of 800 km, passed without incident, despite bad weather.

After Flight 3E1 (future E1 at Berre), the first unit to use the type, CAMS 55s were allocated to 4E1 (future E7 at Karouba), 1E1 (future E2 at Cherbourg), 3E2 (future E3 at Berre), 3E3 (future E5 at Saint-Raphaël), 4S1 (Karouba), 2S1 (Lanvéoc-Poulmic), 1S1 (Cherbourg), 7B2 (Saint-Mandrier), E4 (Berre) and E8 (Tahiti), as well as to training sections at the various bases.

Widely deployed in the Atlantic and Mediterranean theatres, the CAMS 55 provided the backbone of Exploration Flights until the far-off arrival of large reconnaissance flying boats such as the Breguet *Bizerte*, Latécoère 381 or Loire 70. The number in service rose from 43 in May 1932 to 77 in February 1936. With the extension of active use of the CAMS 55, a number of worrying characteristics became apparent, such as absence of forward visibility from the main piloting position (on the left), particularly during take-off at night.

This defect, which was not detected during prototype testing, led to the total loss of at least two CAMS 55s early in its career. The first took place in 1932 and the second in March 1933 at Sfax (Tunisia) during take-off by an aircraft of 4E1 (one killed).

On 24 March 1933, CAMS 55.6 N° 77 arrived at the CEPA. This was the first of the series to have a metal hull and floats. This innovation offered a considerable weight saving of around 400 kg compared with the wooden hulled version.

During testing, it was found that the aircraft had less tendency to '*rebound during take-off and touch down*', compared with the usual wooden hulled CAMS 55. However, due to insufficient performance, no series order was placed and it remained the sole example.

Resulting from a decision taken by the Navy in November 1934, four CAMS 55s were ceded to the *Armée de l'Air* as from 1935. These were allocated to the 5th Indochina Flight at Cat-Laï, near Saigon, as a complement to several CAMS 37s. At the end of March 1935, the Navy urgently decided to enlarge the protection behind the pilots on all CAMS 55s in service, in order to prevent any dangerous contact with the propeller (Author's note: at least two CAMS crew members lost fingers in flight!).

On mobilisation, no more than 25 CAMS 55s remained in service, being divided between Surveillance Flights 1S1 (Cherbourg), 2S1 (Lanvéoc-Poulmic), 3S4 (Berre), 4S1 (Karouba) and 4S2 (formed at Karouba in November) and the Surveillance Section at Tahiti (future 8S5). When the German offensive began on 10 May 1940, 23 of the aircraft were still in unit service. These CAMS 55s carried out many coastal patrol missions up until the Armistice, though now in secondary roles.

These operations were not always routine. On 9 June, the first war casualty concerning a CAMS 55 occurred when N° 85 was shot down by *Flak* near Cléon (Seine-Maritime), while being flown from the Les Mureaux base to Lanvéoc. On 16 June, a CAMS 55 based at Karouba was attacked off Bône without success by an unidentified Italian aircraft.

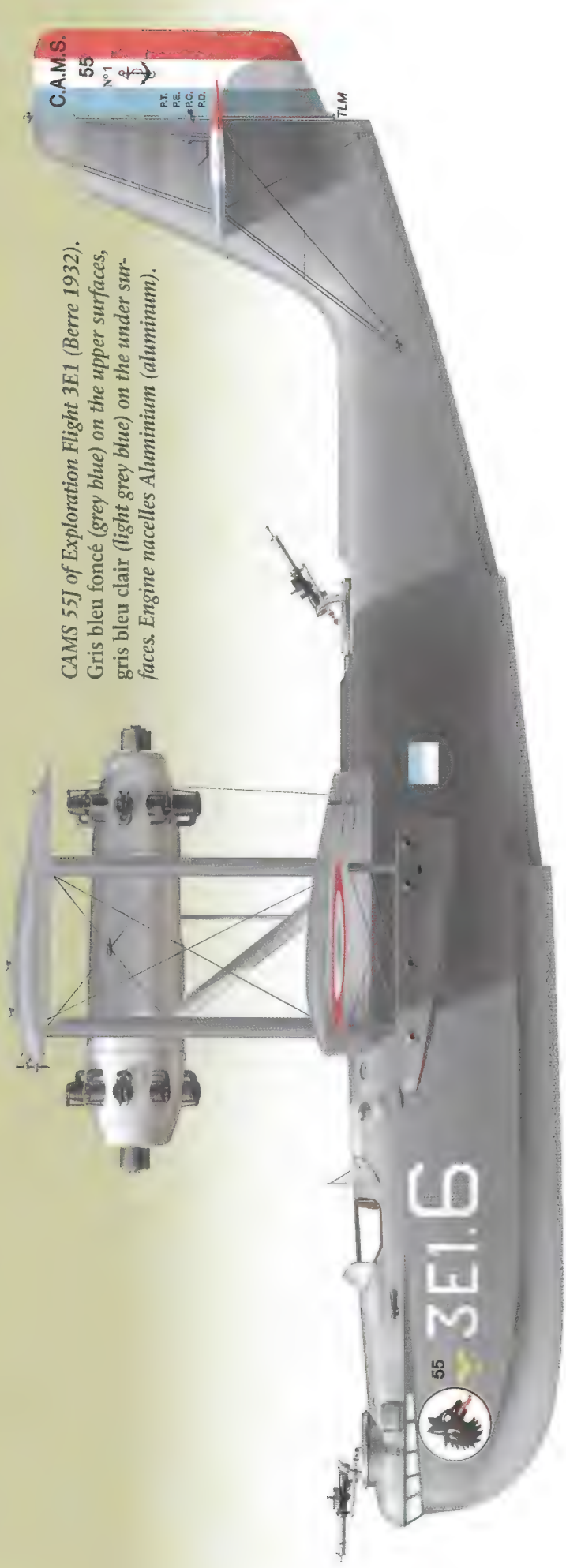
Finally, on 22 June, two CAMS 55s of 4S1 (Karouba) were machine gunned in flight by a '*supposed enemy*' fighter off Karouba. The attacker was in fact an *Armée de l'Air* Morane 406, probably of *Groupe de Chasse* III/5. Following the attack, N° 92 (4S1.1) made a forced landing with two wounded on board near the Bizerta lake and broke in half.[3]

On 3 September 1940, after the obligatory regrouping of aircraft imposed by the Armistice Commissions, the *Aéronautique Navale* made a final tally which showed 15 CAMS 55s, ten at Karouba, two at Berre and three with the Surveillance Flight at Tahiti, this newly-named 20S (ex-8S5 and 5S1).

In October 1941, the nine aircraft remaining at Berre and Karouba were struck off and

3. Barely three months later, on 26 September 1940, a Loire 130 of Flight 4E was also victim of a similar misunderstanding, being shot down off Dakar by a Dewoitine 501 belonging to Flight I/6 of the *Armée de l'Air*.

CAMS 55.2 N° 69, coded 4S1.3 (Surveillance Flight 4S1 – Bizerta-Karouba). Gris bleu foncé *(grey blue) on the upper surfaces,* gris bleu clair *(light grey blue) on the under surfaces. Engine nacelles* Aluminium *(aluminium).*



CAMS 55J of Exploration Flight 3E1 (Berre 1932). Gris bleu foncé (grey blue) on the upper surfaces, gris bleu clair (light grey blue) on the under surfaces. Engine nacelles Aluminium (aluminum).

scrapped. Meanwhile, Flight 20S, renamed FNFL Flight, had joined the Free French and thus was no longer any question of following the order for massive destruction sent from mainland France. The last CAMS 55H (N° 52 in the series) belonging to this unit continued flying on the other side of the world until its final withdrawal in October 1942, thus bringing to an end service of this prolific CAMS series.

The employment of the CAMS 55 in operational units was certainly intense but this had its consequence in human and material terms: between its service entry with 3E1 in 1929 and the beginning of the Second World War ten years later, no fewer than 22 CAMS 55s were lost accidentally, costing the lives of 23 crew members.

Paradoxically, the war period was the least fatal.

In *Aéronautique Navale* service between the wars, the CAMS 55 held the record for the number of aircraft lost for any given type. In terms of fatalities, it was only surpassed by the Farman 168 '*Goliath*' float plane in which, for the loss of only a dozen aircraft, 30 sailors were killed.

Confirmed Air Ministry Contracts
(list not exhaustive)

Various contracts, including 811/0 (total orders for 45 CAMS 55.1)*

Various contracts (total orders for 31 CAMS 55.2)

N° 811/0 of 10/11/30 (order for 25 CAMS 55.1 N°s 29 to 53)

N° 291/2 of 31/3/32 (modification) (order for one metal hulled CAMS 55.6)

N°s 297/3 and 413/3 of 1933 (total orders for 32 CAMS 55.10)

*(*Note: According to some documents we have consulted, the Air Ministry, contrary to the manufacturer, considered the first two CAMS 55s with Hispano engines included in the first contract for four aircraft were also 55.1s and the other two having Gnome & Rhône engines were 55.2s. As a consequence, they integrated these aircraft into the contracts for each of the two variants).*

Manufactured: 110

Sub-types produced and manufacturer's designation:

4 CAMS 55 (N°s 1 to 4)

43 CAMS 55.1/Type H (N°s 5 to 14 and 29 to 61)

29 CAMS 55.2/Type J (N°s15 to 28 and 62 to 76)

1 CAMS 55.6 (N° 77)

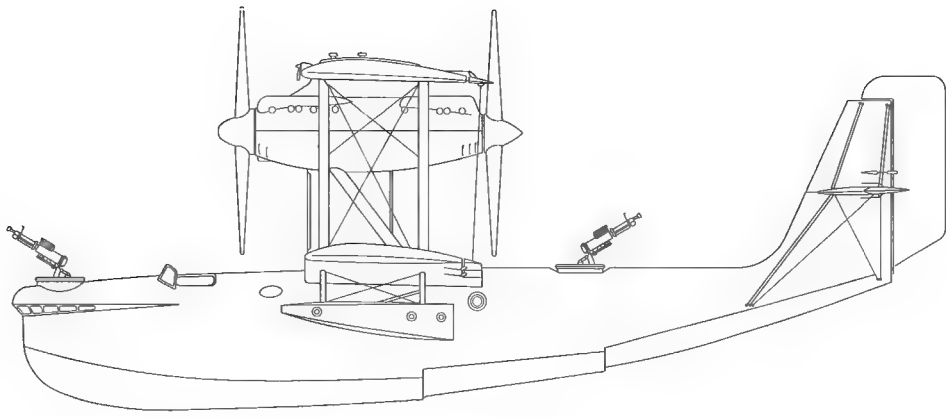
A line of CAMS 55.10 with Gnome & Rhône engines of the Escadrille *2S1 at Lanvéoc-Poulmic. More than one hundred of these flying boats were in service before the war. It was outdated at the end of 1939. During the war it was relegated to the secondary missions.*

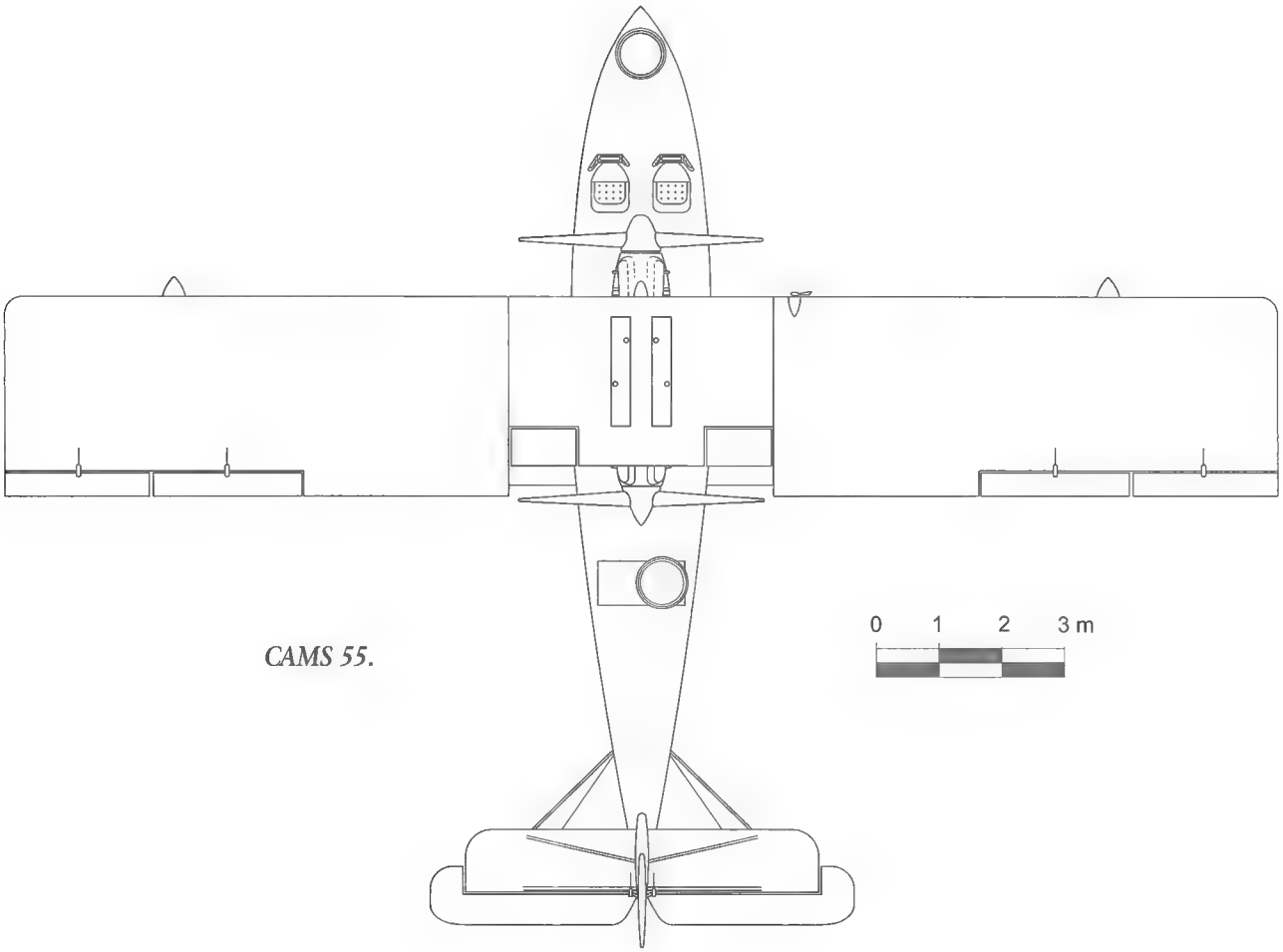
CAMS 55.1/H N° 47, 3S4.4 (Surveillance Flight 3S4 – Berre – 1940). Gris bleu foncé (grey blue) on the upper surfaces, gris bleu clair (light grey blue) on the under surfaces. Engine nacelles in natural metal.

1 CAMS 55.14 (N° 78)
32 CAMS 55.10 (N°s 79 to 110)
In service with the Navy: 106
In service with the *Armée de l'Air*: (1929 – 1942)
Units: Flights 1E1/E2, 1S2, 2S1, 3S4, 4S1/13S, 7B2, E8/5S1/8S5/20S.
FNFL Flight, 3E1/E1, 3E3/E5, 4E1/E7.
Karouba Training Section, Applied Sea Course at Berre.
Other user: 5th Indochina Flight (*Armée de l'Air*).
General characteristics:
Twin engine biplane flying boat, single hull, wooden construction.
Engines: 2 x 500 hp Gnome & Rhône 9 Kdr
Propellers: Four blade Chauvière 5356 (front), two blade 5330 (rear)
Length: 4.90 m (16.08 ft)
Span: 20.40 m (66.92 ft)
Span (wings folded): 8.20 m (26.9 ft)
Height: 5.60 m (18.37 ft)
Wing Area: 113.45 m² (1221 sq ft)
Empty Weight: 4,468 kg (9850 lb)
Laden Weight: 7,000 kg (15,432 lb)
Maximum Speed: 165 km/h (103 mph) at sea level
Alighting Speed: 100 km/h (62 mph)
Take-off Time: 25 sec [6.4 tonnes (14,110 lb)]/1min 52 sec [7 tonnes (15,432 lb)]
Climb Time: 28 min to 2,500 m; [6.4 tonnes (14,110 lb)]
Practical Ceiling: 3,400 m (6.4 tonnes) / 11,155 ft (14,110 lb)
Range: 1,260 km (783 miles)
Crew: Five.
Defensive Armament: 4 x Lewis 7.77 mm (.303) (paired).
Offensive Armament: 2 x 75 kg (165 lb) G2 bombs.

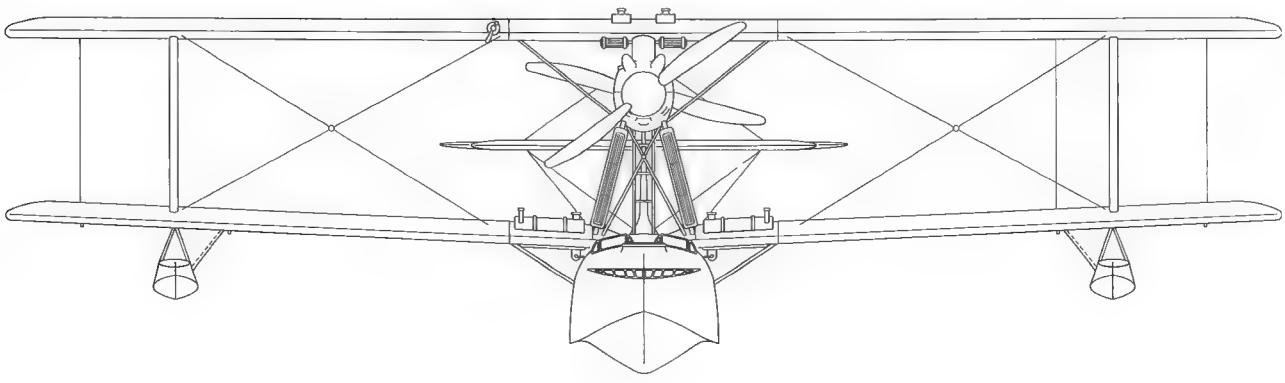
Other types in naval service:

CAMS 55.1/H Hispano-Suiza 12 Lbr (600 hp)
CAMS 55.2/J Gnome & Rhône 9 Akx (480 hp)
CAMS 55.6 Gnome & Rhône 9 Akx (480 hp), metal hull
CAMS 55.14 Gnome & Rhône 9 Kdrs1 (535 hp)



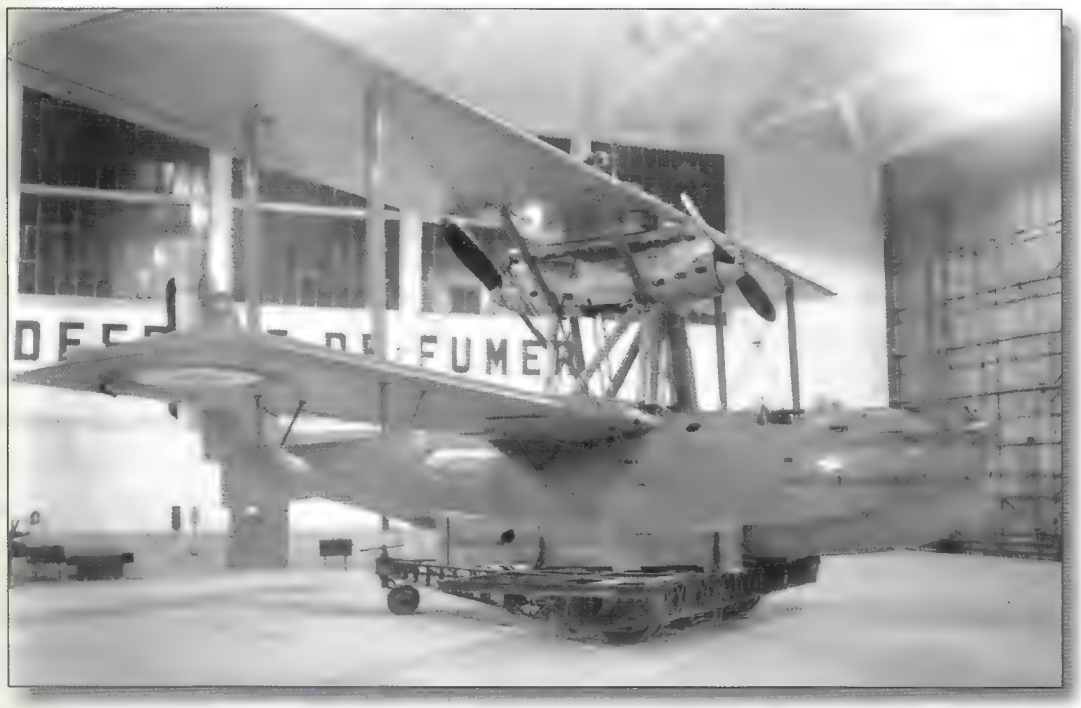


CAMS 55.



CAMS 55 code BZ.42 of the Training Section at Bizerte-Karouba. Behind it can be seen the nose of a CAMS 37 Lia *coded BZ.18.*

CAMS 55/H coded 4E1.1 of Exploration Flight 4E1 (future E7) at Bizerte-Karouba. The white star on the fin shows that this is the aircraft of the Flight commander.



Newly delivered CAMS 55/H N° 8 in its hangar at Berre. In March 1931 this aircraft was a victim of engine failure, after which it drifted on the open sea with its crew for four days...

CAMS 110

The CAMS 110 was developed in response to a 1931 technical programme for Exploration aircraft, though it was not submitted until November 1932 to the CEPANA, which was already burdened with sorting out some twenty projects proposed by competing manufacturers.

Unusually, the aircraft was built by CAMS as a private venture without a government contract. The prototype made its first flight, taking off from the Seine at Sartrouville in July 1934. In December, it continued testing at the CEPA.

In the Navy's opinion, the CAMS 110 was '*an intermediate step between the CAMS 55 and the new Exploration types*' such as the Breguet *Bizerte* and Loire 70.

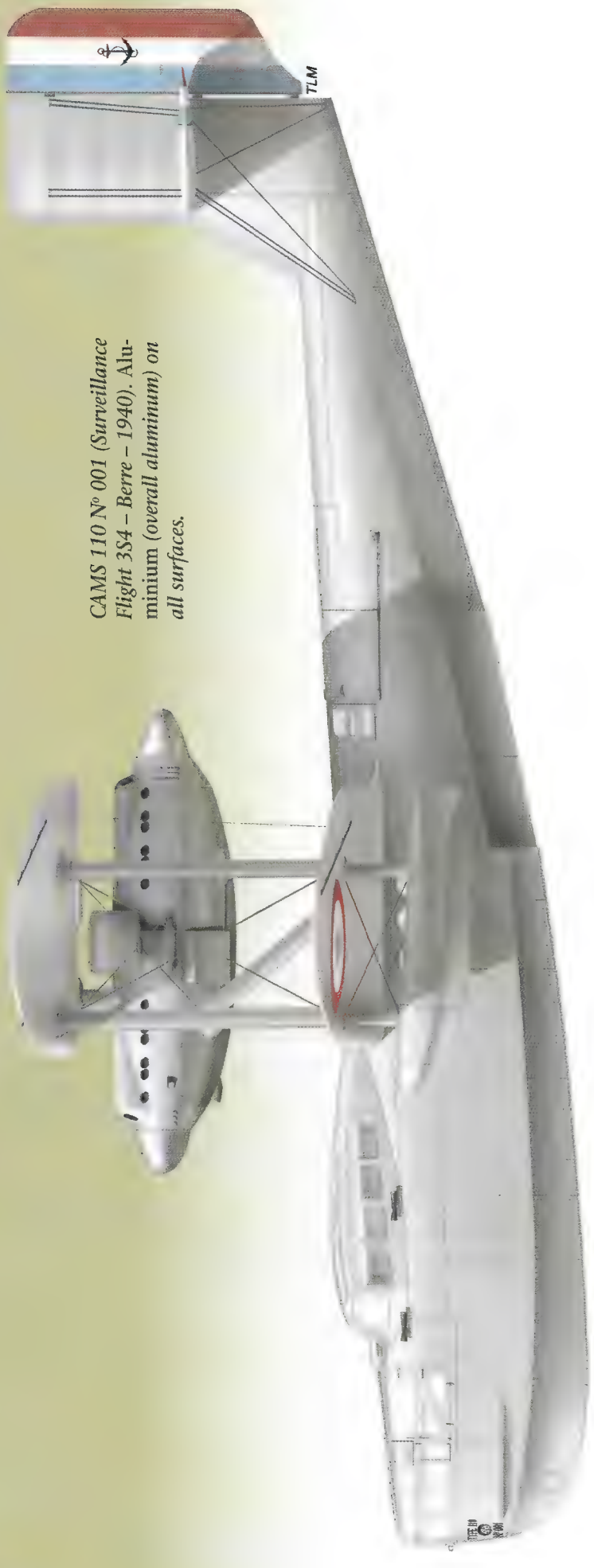
Unusually, the first task allotted to the aircraft during its CEPA tests was commercial, rather than military. On 12 April 1935, *Général* Denain, then Air Minister, charged *Lieutenant de Vaisseau* Nomy with an official exploration mission to the Azores to finalise details of the infrastructure required for a commercial air link across the North Atlantic. With this intention, *L.V.* Nomy took off from Berre at the controls of the CAMS 110 on 8 July 1935 with two official passengers on board, including the Air Ministry representative, M. Giscard d'Estaing.

The aircraft flew non-stop to Lisbon, but it proved impossible to obtain permission from the Portuguese authorities to continue on to the Azores and so the flying boat returned to Berre on 12 July. This abortive mission could be taken as a mark of destiny for an aircraft which was to prove unsuccessful throughout its career.

In March 1936 the CAMS 110 completed its CEPA test programme, in which its marine handling qualities were noted as '*average*'. It now awaited a decision concerning its future.

At that point, the Air Ministry Seaplane section assimilated it into the Exploration category along with aircraft in service such as the CAMS 55, Breguet-Short *Calcutta*, Latécoère 381, Breguet *Bizerte*, Loire 70 and Latécoère 582.

The CAMS 110 under construction at the CAMS Sartrouville factory (1934).



CAMS 110 N° 001 (Surveillance Flight 3S4 – Berre – 1940). Aluminium (overall aluminium) on all surfaces.

But that was as far as it went, since at the same time, the Admiralty had a more cutting view of the aircraft: *'the 110, even though presented after the Bizerte and Loire prototypes, does not fit into the programme for Exploration seaplanes, especially since it has only ten hours' endurance.*

The use of this aircraft cannot be justified even in operational theatres of limited area such as the Mediterranean or the Channel, since the required objective is to maintain contact for as long as possible, practically from dawn to dusk'.

As a result, the Navy refused to place a series order for the 110 even for the *'unique needs of training'* since the CAMS 55 used for this purpose was thought to be quite adequate.

In sum, the Navy saw no immediate use for the CAMS 110 and it was placed at the disposal of the Civil Aviation Directorate at Marignane who registered it as F-ANVX. However, in a ministerial circular of 21 February 1938, the Admiralty decided to set up an *'Applied Sea Course'* for marine pilots, this to begin operating at Berre during that year. This is why the CAMS 110, considered to be only good for training, was taken on once again by the *Aéronautique Navale*. But before this could be done, it needed a general overhaul at Sartrouville. This began in January 1938 and lasted until the following summer.

CAMS 110 hull with starboard Darne gun (7.5 mm) in the CAMS factory.

On this occasion, the mounting of a naval 25 mm cannon in the nose of the CAMS 110 was tried out as an experiment. This idea was of interest to the Navy, which was considering fitting this weapon to the large 'Cruiser' flying boats (Potez-CAMS 141 or Breguet 730) about to enter service. However, this armament was not kept on the CAMS 110.

After taking off from Sartrouville on 8 November 1938, the CAMS company's test pilot, Médéric Rousset, flew the aircraft to the *Aéronautique Navale* General Depot (EGAN) for seaplanes for the Paris region at Les Mureaux. It stayed there for over six months without any specific assignment. Then, on 22 May 1939, it finally left there for Berre in the hands of a naval crew, flying via La Charité-sur-Loire and Macon. At first attached to the Sea Application Course, it was then handed over on mobilisation to Surveillance Flight 3S4, still at Berre, where it was kept in stock

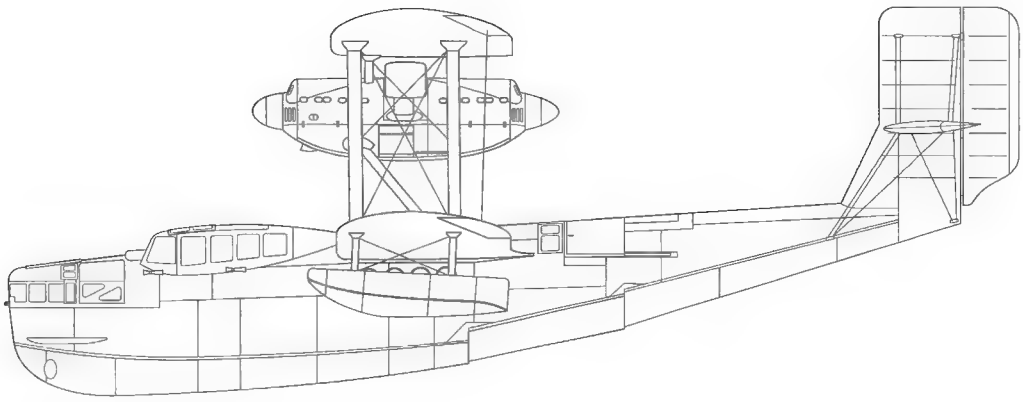
Looking like a large flying fish, the CAMS 110 seen in profile at the Sartrouville factory in 1934.

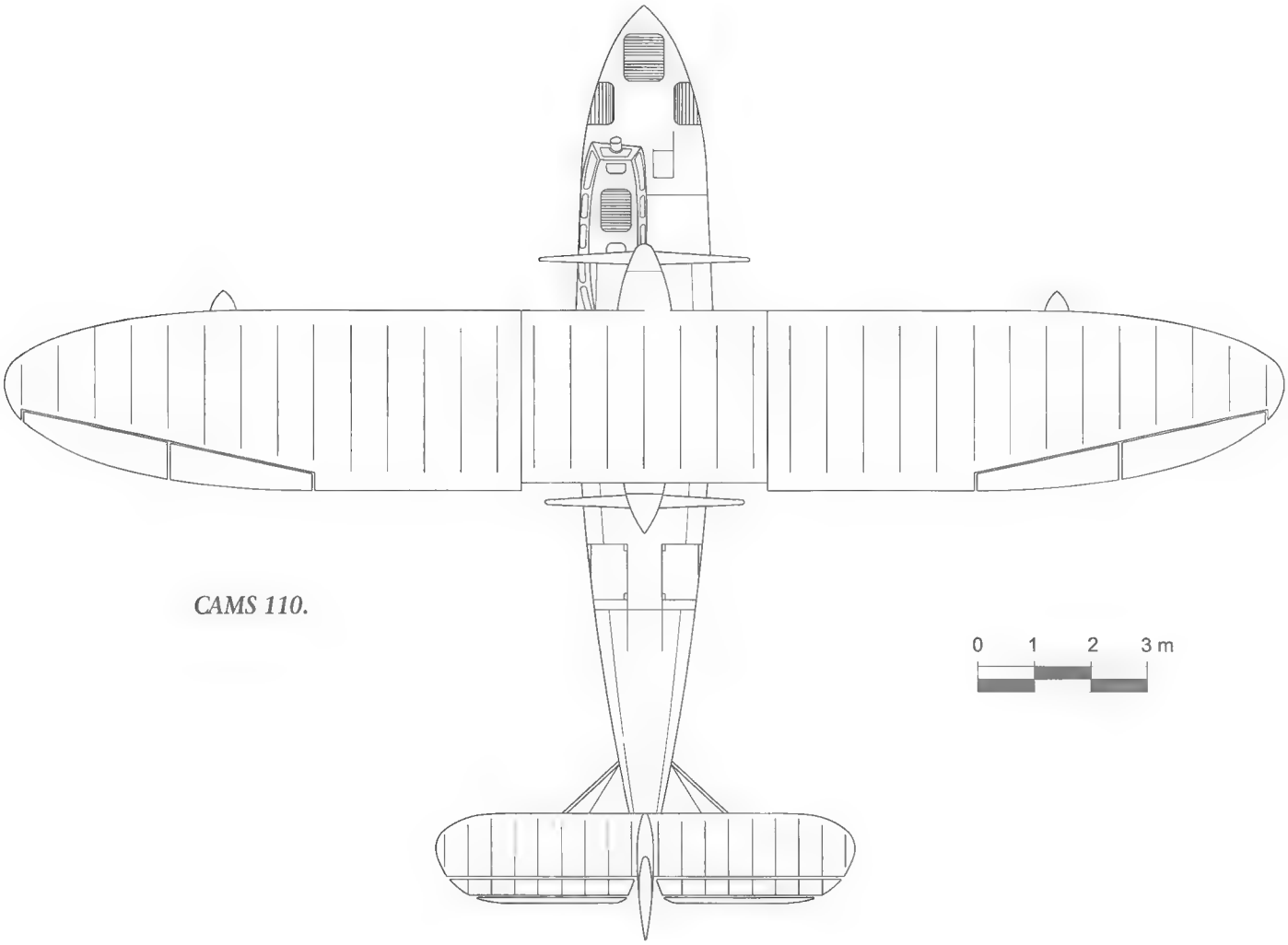
The CAMS 110 moored on the Seine in front of the Sartrouville factory.

The CAMS 110 at Marignane, bearing the civil registration F-ANVX before its transfer to the Navy.

for several months. This ill-assorted unit was made up of antiquated seaplanes, such as CAMS 55, Breguet-Short *Calcutta* and Farman 470/471. The CAMS 110 was soon condemned on 2 December 1939, without having flown a single wartime mission. The official reason given was lack of spare parts, but the reality was more likely to have been the sailors' lack of confidence in it.

Air Ministry Contract:
No contract was issued for purchase of the prototype.
N° 1599/7 of 23/2/38: (mounting of a 25 mm cannon).
Manufactured: One
In *Aéronautique Navale* service: One (1938 – 1939).
Unit: Sea Application course (Berre), 3S4 (Berre).
General Characteristics:
Twin engine metal hull biplane flying boat
Engines: 2 x 880 hp Hispano-Suiza 12Ydrs1
Length: 16.30 m (53.47 ft)
Span: 22.50 m (73.81 ft)
Wing Area: 115 m² (1238 sq ft)
Height: 6 m (19.68 ft)
Empty Weight: 9,252 kg (20,397 lb)
Laden Weight: 10,500 kg (23,148 lb)
Maximum Speed: 223 km/h at 1,500 m (139 mph at 4921 ft)
Cruising Speed: 165 km/h (103 mph)
Ceiling: 6,500 m (21,325 ft)
Climb Time: 18 min to 3,000m (9842 ft)
Range: 1,600 km (994 miles)
Crew: 5/6
Defensive Armament: 4 x Darne 7.5 mm, 1 x 25 mm cannon.
Offensive Armament: 4 x 75 kg (165 lb) bombs.





CAMS 110.

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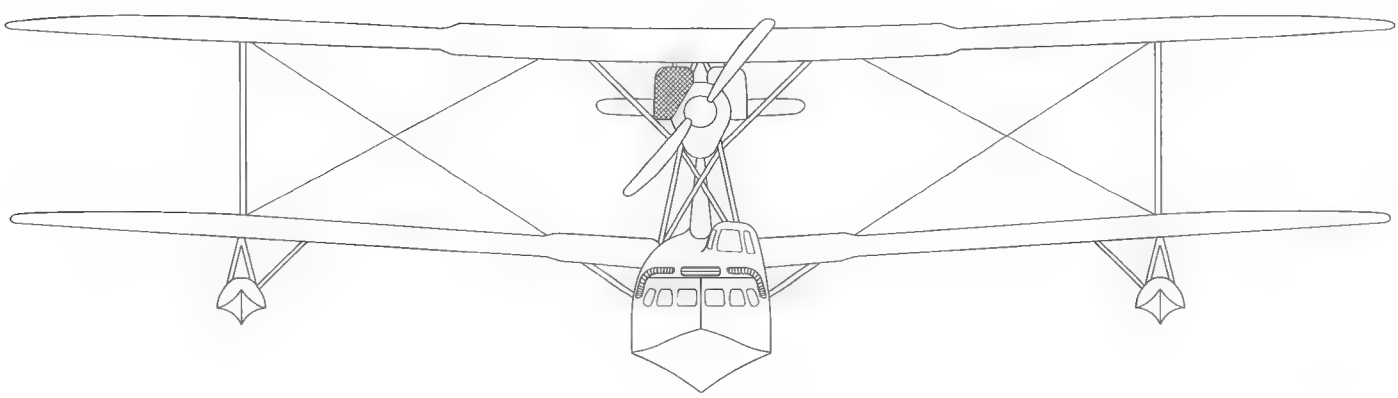


Latécoère 301

De l'Orza

The Latécoère 301 was a development of the famous *Croix du Sud* (LATE 300), well known in aviation history as the final resting place of Jean Mermoz.

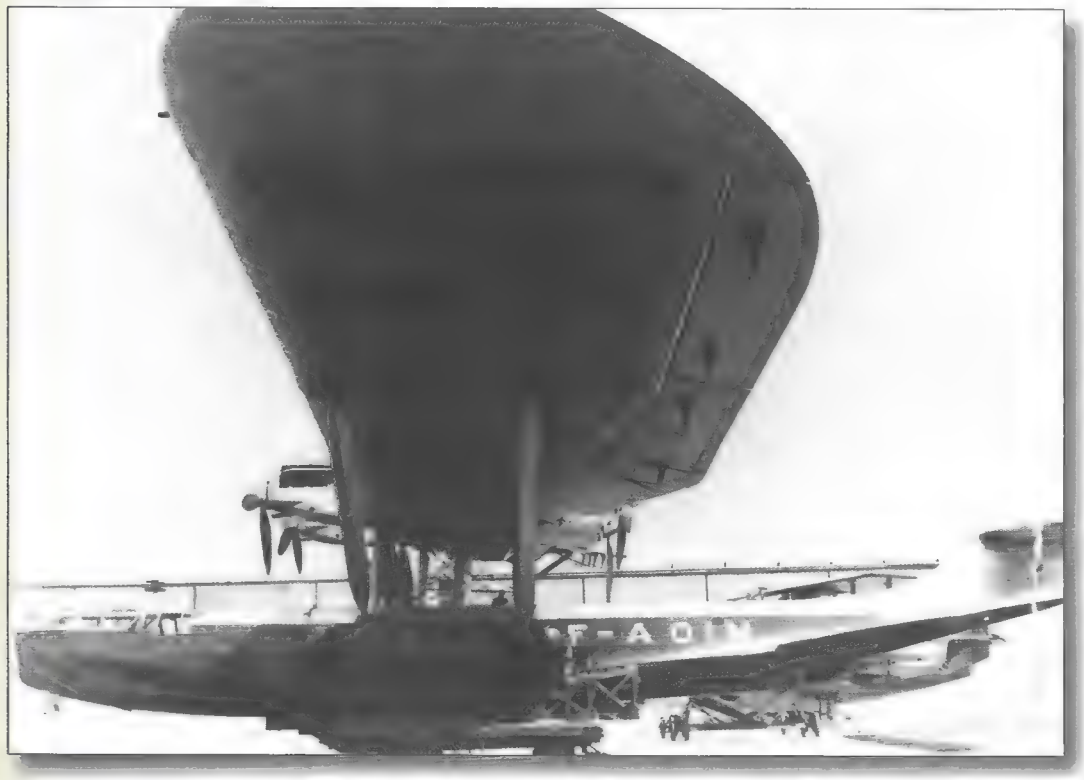
The future *De l'Orza* was the third Latécoère 301 to be built (manufacturer's serial number 1018). Ordered in December 1934 to operate on the South Atlantic link, it first flew at Biscarrosse on 18 January 1934 with the crew Gonord-Vergès. Registered F-AOIM and first named *Nadir* and then *Ville de Santiago*, it was operated by Air France between Dakar and Natal until December 1936, crossing the South Atlantic 18 times.

In February 1938, Guillaumet flew it back to France at Marignane, where its career with Air France came to an end. In April, it was decided to place it at the disposition of the *Aéronautique Navale*, with whom it was allocated to Flight E4 at Berre, a unit already using the military version of this flying boat (Type 302). On 24 May, it was renamed *Lieutenant de Vaisseau de l'Orza*[1]. At the beginning of June, it was decided to equip it with defensive armament, while keeping in line with the Navy's instruction to *'keep modifications to the strict minimum'*.

At the beginning of the war, the *De l'Orza*, coded E4.4 and commanded by *E.V.* de Roux, was stationed at Lanvéoc-Poulmic.

During September and October, it was fitted with five gun positions, each equipped with a 7.5 mm Darne machine gun (one forward turret, two others in the engine nacelles and two more firing from hatches in the rear fuselage). Four bomb racks were also fitted. Additional military equipment consisted of an automatic pilot and radio. The aircraft, which had by then completed 480 flying hours with Air France, left Brest for Dakar at the beginning of November 1939 to join Flight E4 with the aim of reinforcing *Aéronavale* forces in French West Africa.

1. *Lieutenant de Vaisseau* Pierre de L'Orza was a naval pilot killed on 24 September 1936 during night landing tests on the aircraft carrier *Béarn*.



Latécoère 301 F-AOIM. Note the impressive wing area.

On arrival, it joined the three LATE 302s of Flight E4 which had already reached Dakar at the end of August. During the following months, the *De l'Orza* carried out exploration flights in the Dakar sector.

However, at the beginning of May, the aircraft was in need of a general overhaul and the fabric covering of its flying surfaces needed complete renewal. As the necessary 300 m² of new fabric were unavailable at Dakar, this work could only be carried out in mainland France. It was decided to send the aircraft back to its manufacturer, Latécoère. The *De l'Orza* thus left for France on 20 May 1940.

Four days later, it arrived at Berre and on the 27th it was at Hourtin. The following day, it touched down on Biscarrosse lake and was put into Latécoère's hangar there. The task of re-covering was underway when an order was received to stop work immediately. It was now necessary to remove the aircraft's four Hispano-Suiza 12 Nbr engines for urgent fitting to another flying boat, which the Admiralty considered as having greater priority. When the Biscarrosse base was evacuated on the morning of 24 June

Latécoère 301 (manufacturer's N° 1018). This is the future De l'Orza, *registered here as F-AOIM, Ville de Santiago, in service with Air France.*

Latécoère 301 De l'Orza, *ex F-AOIM, in service with Exploration Flight E4 of the* Aéronautique Navale *at Dakar at the end of 1939 (Code E4.4).*

Very rare photo of German origin showing De l'Orza *bearing 4 and not E44 code, in Latecoère Biscarrosse factory; Note Latécoère 298 in background and Breguet 790 N° 2 (right) – June 1940.*

1940, the *De l'Orza* was abandoned in Latécoère's hangar, where it was found by German troops. It was later scrapped on the spot.

Civil Programme

Civil Contract

N° 920/4 of 28/12/34

Manufactured: Three

In *Aéronautique Navale* service: One (1939 – 1940).

Unit: Flight E4 (Code: E4.4, Name: *De l'Orza*).

General Characteristics:

(Manufacturer's serial N° 1018)

Metal hulled four engine (two in tandem) sesqui-plane flying boat

Span: 44 m (144.35 ft)

Length: 26.15 m (85.79 ft)

Height: 7.98 m (26.18 ft)

Wing Area: 258 m² (2,755 sq. ft)

Engines: 4 x 650 hp Hispano-Suiza 12 Nbr

Propellers: 3-blade Ratier, pitch variable in flight.

Empty Weight: 12.65 tonnes (27,888 lb)

Laden Weight: 23.85 tonnes (52,580 lb)

Max. Speed at Sea Level: 210 km/h (130 mph)

Cruising Speed: 185 km/h (115 mph)

Practical Ceiling: 4,300 m (14,107 ft)

Range: 3,600 km (2237 miles)

Climb Time: 45 min to 3,500 m (11,483 ft)

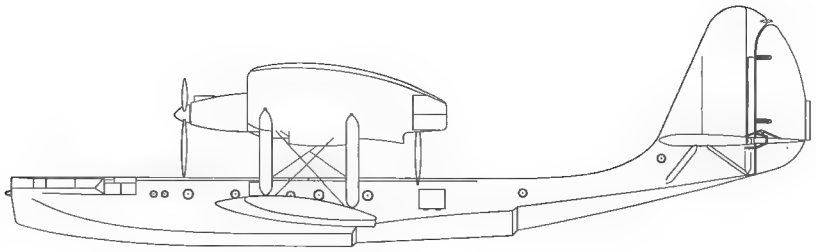
Take-off Time: 27 sec

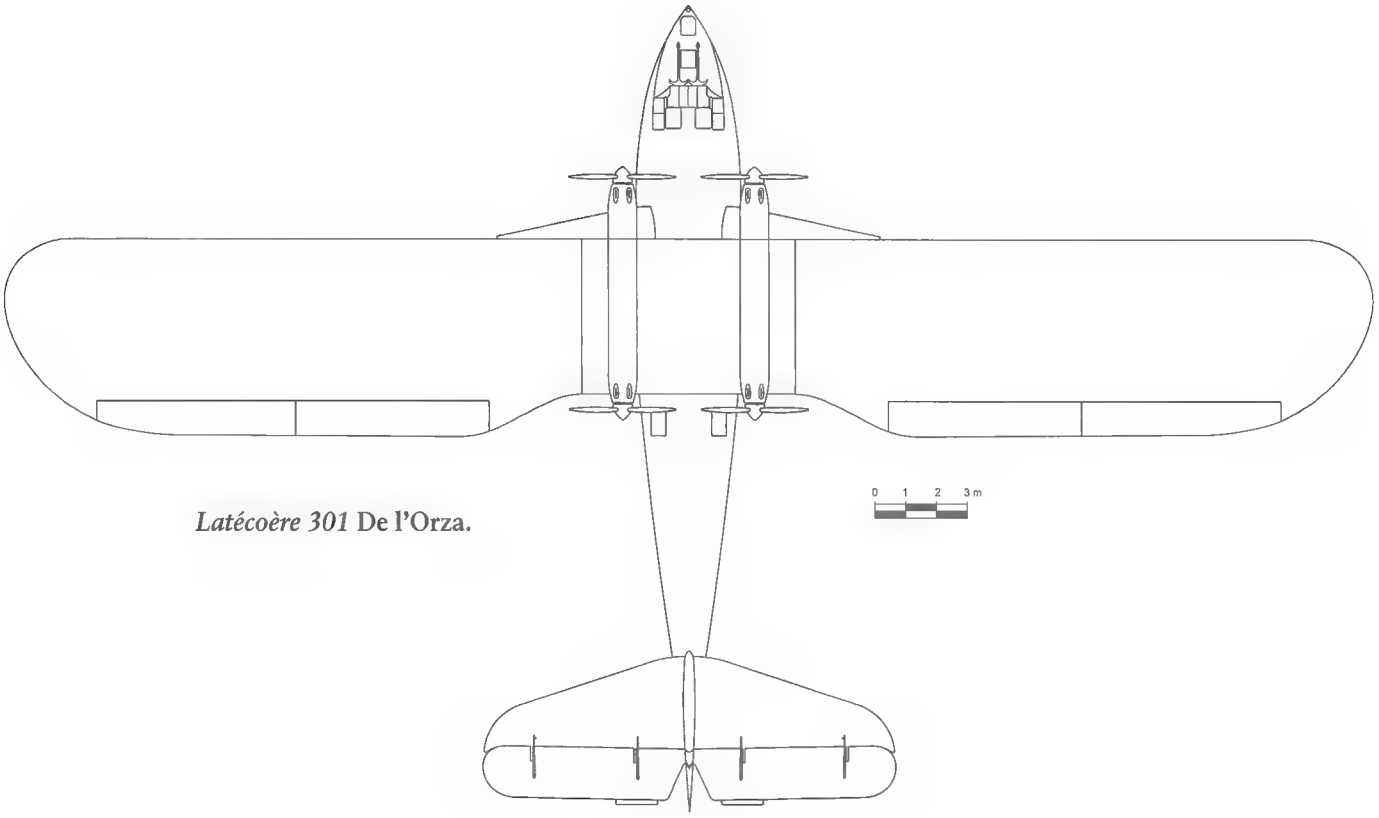
Crew: Ten

Armament: 4 x 75 kg (165 lb) G2 bombs or 150 kg (330 lb) I2, 4 x Darne 7.5 mm machine guns

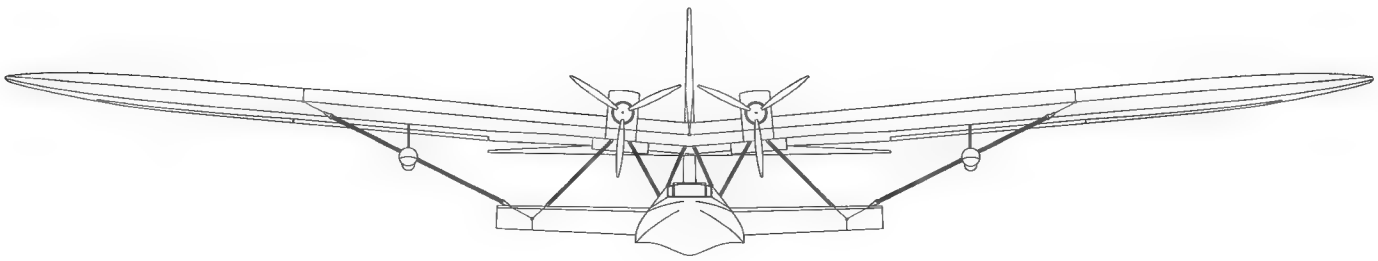
A close-up view of De l'Orza *at Dakar bearing the* Croix du Sud *insignia of Flight E4.*

Latécoère 301 De l'Orza E4.4 (Exploration Flight E4 – Dakar – 1939). Blanc (white) on the upper surfaces, noir (black) on the under surfaces. Aluminium (overall aluminum) on wingsand engine nacelles.





Latécoère 301 De l'Orza.



Latécoère 302

Guilbaud – Cavellier de Cuverville – Mouneyrès

The Latécoère 302 was a militarised derivative of the famous postal Latécoère 300 *Croix du Sud*. The Navy was very much involved in testing the civil prototype, providing a military crew under the orders of *Commandant* Bonnot. As a result, it was most impressed by the aircraft's great range, at a time when it lacked such a type of large Exploration flying boat.

In May 1934, *Amiral* Durand-Viel, Chief of Naval General Staff, proposed the purchase of three military derivatives of the *Croix du Sud*, without issuing any official specification. It should also be noted that, at the same time, plans were being prepared for mobilising the three civil LATE 301s. A government contract for the purchase of *'three Latécoère 302 Exploration flying boats'* was signed in September 1934.

Even before they flew, the three aircraft were given *'distinctive names'* in January 1936, as follows: *Guilbaud, Cavellier de Cuverville* and *Mouneyrès*, in memory of three naval pilotes lost at sea[1]. The three aircraft first flew from Biscarrosse with the usual factory crew of Gonord and Vergès on 9 February (*Guilbaud*), 3 March (*Cavelier*) and 23 April 1936 (*Mouneyrès*).

After brief testing at Biscarrosse, they were allocated in May 1936 to Exploration Flight E4. This unit, placed under the command of *Capitaine de Corvette* Baron, was specially created for these aircraft which all bore the celebrated *Croix du Sud* insignia of the prototype LATE 300 flown by Mermoz.

1. L.V. Hervé Mouneyrès was lost with all hands attempting to cross the South Atlantic in a Farman Goliath on 5 May 1927. C.C. René Guilbaud and his second-in-command L.V. Albert Cavellier de Cuverville, were lost on board a Latham 47 on 18 June 1928 while trying to assist the Italian airship Italia at the North Pole.

Fine photo showing Latécoère 302 Mouneyrès *(series N° 1023 / coded E43. Berre navy station 1936.*

Latécoère 302 Cavelier de Cuverville *(code E4.2) seen here before the war.*

The unit was to have been attached to the Lanvéoc-Poulmic base but since this was not yet ready, a temporary solution was found by provisionally setting up E4 at Berre. While there, Latécoère factory engineers modified the nose of the LATE 302s in December 1936 and January 1937, altering the positions of the navigator and air gunner through fitting a raised 'Gobert firing post'. Following the modifications, the three aircraft took part in manoeuvres off the coast of West Africa in the Canary Islands zone in support of the French fleet.

E4 was transferred to Lanvéoc-Poulmic in May 1938, but as war approached, the Admiralty decided to strengthen the presence of the *Aéronautique Navale* in the South Atlantic. As a result, E4's three LATE 302s were transferred to Dakar at the end of August 1939, to be joined in November by LATE 301 *De l'Orza*, ex-Air France. The codes allocated to the four aircraft were as follows: E4-1 (*Guilbaud*), E4-2 (*Cuverville*), E4-3 (*Mouneyrès*) and E4-4 (*De l'Orza*).

On the outbreak of war, this unit carried out long and monotonous exploration and convoy protection missions off the Cape Verde islands. Up until the Armistice, the most noteworthy missions were the search for the German ship *Ostmark* by *Guilbaud* on 3 September 1939 and participation in the halting of the German cargo vessel *Halle*, which was obliged to scuttle itself on 16 October. Finally, there was the rescue of *Mouneyrès*, towed into Dakar on 19 November after drifting for several days on the ocean after coming down near Brava (Cape Verde islands) as a result of a double engine failure[2].

In May 1940, *De l'Orza* was sent back to Biscarrosse to undergo a major overhaul while the other three flying boats remained at Dakar. By the time hostilities ceased at the end of June 1940, the four Latécoère 302s had carried out at total of 66 wartime missions, some of which were very long, lasting from 10 to 14 hours. Of these, 24 were flown by *Guilbaud*, 17 by *Cuverville*, 14 by *Mouneyrès* and 11 by *De l'Orza*. When the British fleet carried out its joint attack on Mers-el-Kebir and the port of Dakar at the beginning of July 1940, *Guilbaud* was carrying out an open sea reconnaissance flight when it was fired on by enemy vessels; it also bombed a French submarine by mistake but without causing any damage. *Mouneyrès* was also fired on by British warships while observing them from a distance.

After these events, Flight E4, now renamed 4E, continued its activities being reinforced by two Loire 130s from a disbanded unit and the lone Potez-CAMS 141 *Antarès* which came from Flight E8. During the attack on Dakar on 23 and 24 September 1940, the LATE 302s distinguished themselves again.

2. In April 1939, the most important spare parts from the civil LATE 301 Ville de Rio, which had not flown since the beginning of the year and was being withdrawn, were ceded to the *Aéronautique Navale* at Dakar by the Directorate of Civil Aviation, the rest being scrapped on the spot. In this way, LATE 302 *Mouneyres*, the military version of the 300, found itself fitted by 'cannibalisation' with the rudder bearing the unlikely manufacturer's serial (LATE 301 N° 1017 in place of LATE 302 N° 1023) coming from the *Ville de Rio*, a fanciful detail which puzzled aircraft historical specialists for quite a long time.

Latécoère 302 Guilbaud *(series Nº 1021, code E41) of Exploration Flight E4.* Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces.* Aluminium *(overall aluminum) on wings and engine nacelles.*

Latécoère 302 Guilbaud *(code E4.1) seen here at Biscarrosse before the war.*

Latécoère 302 Cavelier de Cuverville *(code E4.2) (Exploration Flight E4 – Berre – 1936).* Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces.* Aluminium *(overall aluminum) on wings and engine nacelles.*

Latécoère 302 Mouneyrès *shown with and without forward firing turret (one Darne 7.5 mm).* Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces.* Aluminium *(overall aluminum) on wings and engine nacelles.*

Mouneyrès *E4.3 in flight. Note the raised forward firing position, not present in the preceding photograph of this aircraft.*

Detailed view of the forward firing turret on Mouneyrès: it cannot have improved the pilot's view.

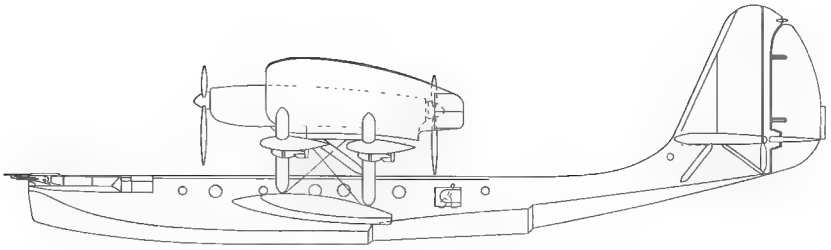
Mouneyrès, in conjunction with *Antarès*, was credited with the destruction of a British *Swordfish* torpedo bomber operating from the carrier *Ark Royal*. This feat was achieved by the flying boat firing its armament while still moored! While observing several enemy vessels, *Cuverville* was chased by three British aircraft but without exchange of fire.

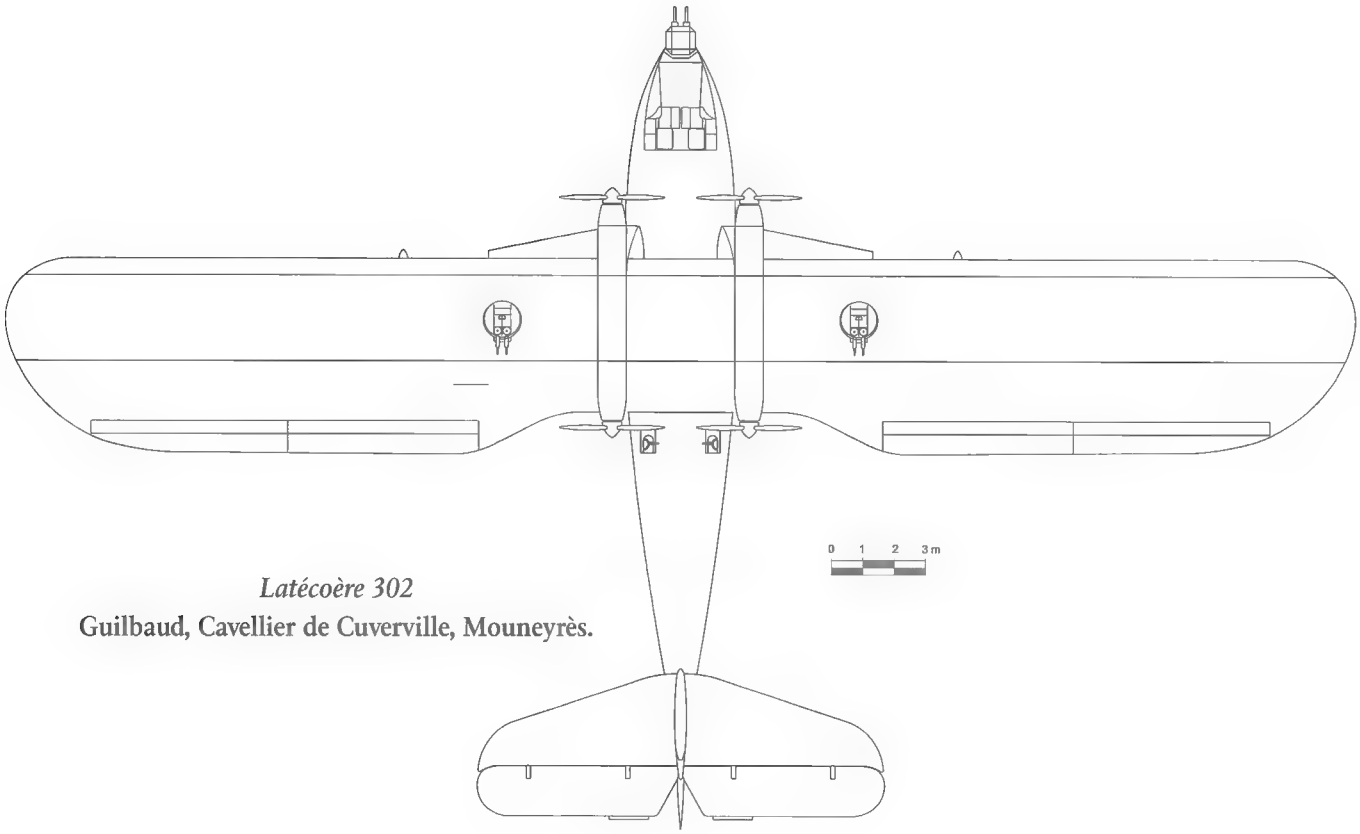
For better or worse and given their age and premature wear of the fabric covering of their flying surfaces due to the climate, the three Latécoère 302s valiantly continued their exploration missions from Dakar, these being sometimes limited to 10 hours per month due to their general decrepitude[3]. Their days were nevertheless numbered and all three were finally withdrawn one after the other; *Cuverville* in April 1941, followed by *Guilbaud* the following June and *Mouneyrès* in November.

By the end of their well filled careers, they were each approaching one thousand hours in the air, *Cuverville* in particular.

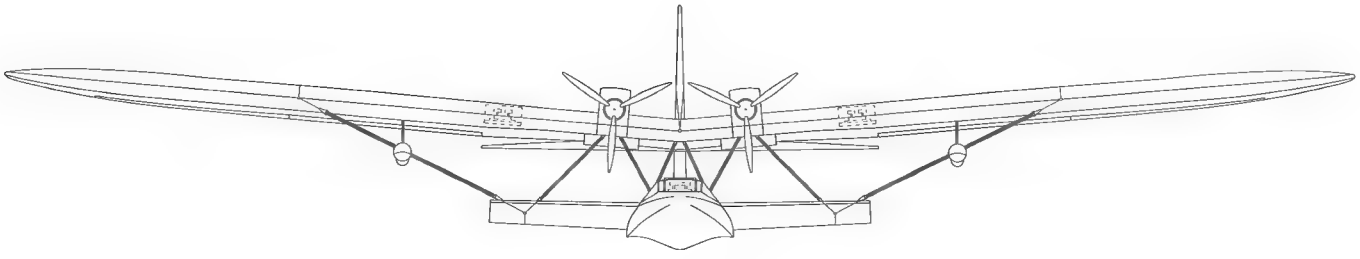
Latécoère 302 Mouneyrès *(code E4.3) at Biscarrosse, the 3rd and last aircraft of the 302 series.*

3. Fabric covering was not the only item subject to wear with age. In the prevailing climate, the hulls, like those of ships, tended to become covered with barnacles which penetrated the layers of protective coating, fixing themselves directly to the aluminium surface. Scraping down and repainting the hull of a LATE 302 occupied thirty men for four days!





Latécoère 302
Guilbaud, Cavellier de Cuverville, Mouneyrès.



Fine view of Mouneyrès *in front of Berre navy station.*

Manufactured Outside of Military Programme
(equivalent: 'Exploration' class of 1932)
Contract N° 591/4 of 14/9/34 (order for three Latécoère 302).
Manufactured: Three.
In *Aéronautique Navale* service: Three (1936 – 1941)
Factory N° 1021/ Code E4-1 *Guilbaud*
Factory N° 1022/ Code E4-2 *Cavellier de Cuverville*
Factory N° 1023/ Code E4-3 *Mouneyrès*
Units: E4/4E.
General Characteristics:
Metal hulled four engine sesqui-plane flying boat
Span: 44 m (144.35 ft)
Length: 26.15 m (85.79 ft)
Height: 7.98 m (26.18 ft)
Wing Area: 256 m² (2756 sq ft)
Engines: 4 x 930 hp Hispano-Suiza 12 Ydrs.2
Propellers: 3-blade Ratier, pitch variable in flight
Empty Weight: 13.9 tonnes (30,644 lb)
Laden Weight: 23.7 tonnes (52,249 lb)
Max. Speed at Sea Level: 235 km/h (146 mph)
Cruising Speed: 160 km/h (99 mph)
Practical Seiling: 3,500 m (11,483 ft)
Range: 3,100 km. (1926 miles)
Climb Time: 45 min to 3,500 m (11,483 ft)
Take-off Time: 25 sec
Crew: Ten
Armament: 4 x 75 kg (165 lb) G2 bombs or (330 lb)150 kg I2, 4/5 x Darne 7.5 mm machine guns (wing armament not fitted)

Latécoère 521

Lieutenant de Vaisseau Paris

The Latécoère 521 was developed in response to programme issued in 1930 by the Air Ministry which called for a 'heavyweight seaplane' intended for Mediterranean commercial use.

Latécoère replied to this request by proposing the type 520, a four-engine aircraft of 28 tonnes, one of which was ordered in August 1931. This first project was abandoned, but a six-engine variant with new engines led to a change in designation, leading to the type 521 in 1934.

The authorised weight of the new aircraft was raised to 37 tonnes. It was then given the name *Lieutenant de Vaisseaux Paris*, to commemorate an officer who held a number of world records while flying a Latécoère 28-5 float plane and who died in 1934. At that point, the Air Ministry showed its interest in the capability of this aircraft for the North and South Atlantic routes.

In November 1934, the *Lieutenant de Vaisseau Paris* was moved by road in several parts from the Toulouse-Montaudran factory, where it had been completed, to the seaplane base at Biscarrosse in the Landes.

The works pilots Jean Gonord and Pierre Crespy made the aircraft's first flight on 15 January 1935. The test programme of the *Lieutenant de Vaisseau Paris* was marked by a small fire on the ground and a deformation of the hull during a landing but, positively, by several world records in the heavy seaplane category, achieved on 6 June. Six days later, it flew out to meet the transatlantic liner *Normandie* off Le Havre. However, on 14 June, it was damaged in the port of Le Havre and was immobilised until August. In November 1935, it was allocated the registration F-NORD on completion of testing by the manufacturer and then handed over to a naval crew under the orders of *Commandant* Bonnot.

At the beginning of December, the aircraft flew to Dakar, continuing on to Fort-de-France in Martinique. On 13 January 1936, it touched down at Pensacola in Florida (USA) but sank at its moorings the next day, hit by a tornado which struck the seaplane base during the night.

Despite this, the *Lieutenant de Vaisseau Paris* was rebuilt and resumed flying on 19 May 1937. It was then handed over to the *'Compagnie Air France-Transatlantique'* to begin its first exploratory flights across the North Atlantic, from now on with a civil crew in command (Henri Guillaumet and Henri Leclaire).

On 26 October 1937, it beat the straight line distance record across the South Atlantic (5,771 km) followed by four new international records in December, including the heaviest load carried to 2,000 metres (18 tonnes) for all categories, including land planes. Then, between August 1938 and August 1939, it made eight commercial North Atlantic crossings between Biscarrosse and New York, taking the Blue Ribbon away from transatlantic liners for the fastest ocean crossing in July 1939.

F-NORD at Berre before the war. Note the impressive wing span.

Latécoère 521 Lieutenant de Vaisseau Paris, *registered F-NORD, seen here at Berre when in service with the* Air France Transatlantique *airline.*

On 7 September 1939, the Latécoère 521 and 522 *Ville de Saint-Pierre* were transferred to the Navy under the mobilisation plan. On the same day, the Admiralty formed a new unit consisting of just these two aircraft, Flight 12E, based at Lanvéoc-Poulmic, commanded by *Lieutenant de Vaisseau* Couralet. At the same time, the civilian *Air France Transatlantique* crews common to both aircraft were also mobilised and given military ranks, among them *Lieutenant* Guillaumet. At the same base, the *Aéronautique Navale* also brought together the other three large Latécoère 523 series flying boats, *Algol*, *Aldébaran* and *Altair* of Flight E6 under the command of *Capitaine de Corvette* Bernard. On 18 September 1939, *Algol* came down at sea off Ouessant and was scuttled while under tow. The *Lieutenant de Vaisseau Paris* and the *Ville de Saint-Pierre* were then incorporated into Flight E6 replacing *Algol* and Flight 12E was dissolved. During October, command of the LATE 521 was given to *Lieutenant de Vaisseau* Mathon, previously commander of *Algol*. Even though now allocated to Flight E6, the *Lieutenant de Vaisseau Paris* had not yet flown with that unit as it remained to be converted for military use.

In practice, its forward hull design was poorly suited for use as an Exploration flying boat. As a result, it was fitted with four bomb racks, two rear apertures for Darne machine guns, six sleeping berths and new Hispano-Suiza 12Y27 engines capable of using more readily available lower octane fuel. Its forward hull was completely redesigned and modified through the mounting of a long 'glass-house'.

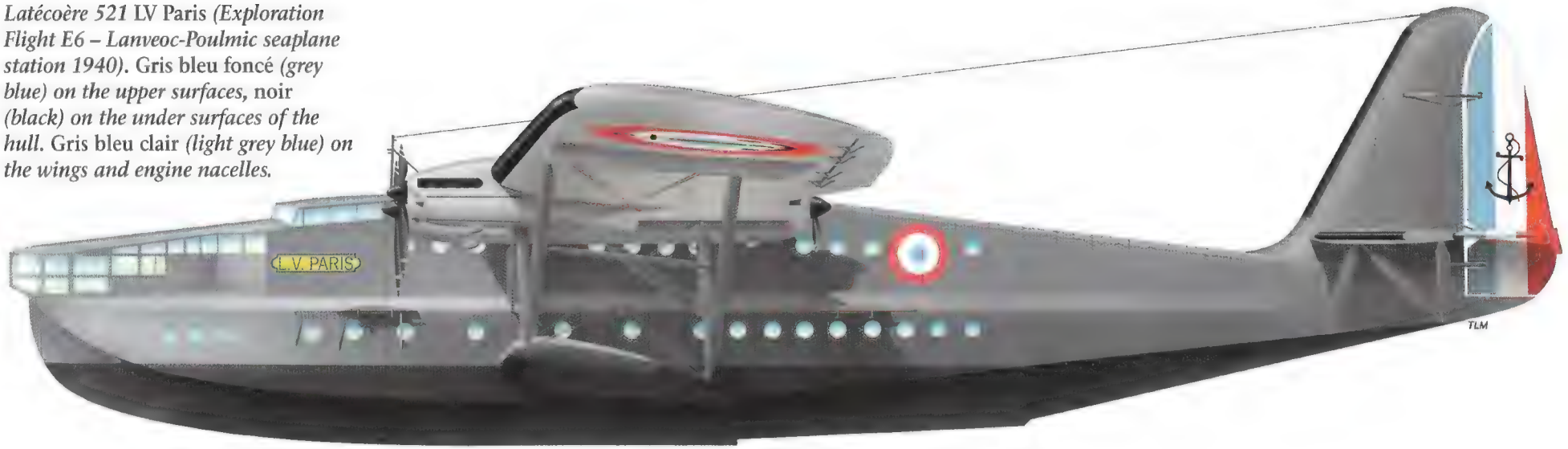
By 18 November 1939, Flight E6 was composed of the four heaviest flying boats in the *Aéronautique Navale*: E6.1 *Altair*, E6.2 *Aldébaran*, E6.3 *Lieutenant de Vaisseau Paris* and E6.4 *Ville de Saint-Pierre*.

Due to delay in delivery of its new engines, the LATE 521 did not resume flying after its conversion until 2 February 1940. On the 13th, it flew to Lanvéoc-Poulmic and undertook its first wartime mission on the 23rd.

On 18 June, to escape German troops along with many other aircraft, the *Lieutenant de Vaisseau Paris* hurriedly left Lanvéoc-Poulmic for Biscarrosse. On the following day, it flew a long-range reconnaissance mission to Port-Lyautey (Morocco), remaining there for the next four days. On 24 June, following an 11 hour reconnaissance flight, it returned to Biscarrosse to be available to evacuate leading personalities from France but this did not happen.

After refuelling on the spot, the LATE 521 took off from the base at dawn on 25 June, despite the cease-fire which had intervened a few hours before, making an 11 hour flight back to

Latécoère 521 LV Paris *(Exploration Flight E6 – Lanveoc-Poulmic seaplane station 1940).* Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the under surfaces of the hull.* Gris bleu clair *(light grey blue) on the wings and engine nacelles.*



LV Paris *of Flight E6, newly converted for use as an Exploration flying boat, seen here at Lanvéoc-Poulmic awaiting its military markings.*

Close up of the Latécoère 521 at the Biscarrosse factory with modified forward hull. The wing of Latécoère 611 Achernar *can be seen in the background.*

Port-Lyautey. During its war service, the *Lieutenant de Vaisseau Paris* accumulated 230 flying hours during 20 missions, but without sighting a single enemy submarine.

As from 1 August 1940, it was attached to Flight 6E (ex-E6) along with Latécoère 523 *Altaïr*, the Potez-CAMS 141 *Antarès* and the Latécoère 611 *Achernar*. After changing an engine, the *Lieutenant de Vaisseau Paris* left Morocco on 27 August for a stop-over at Karouba before transferring to Berre where it was to be stocked and demobilised on the orders of the occupying powers.

On 7 October 1940, the aircraft took off from Karouba and touched down at Berre. Its career with 6E ended on that day. During October, the Italian authorities demanded the removal of one engine to counter any desire to abscond on the part of French sailors.

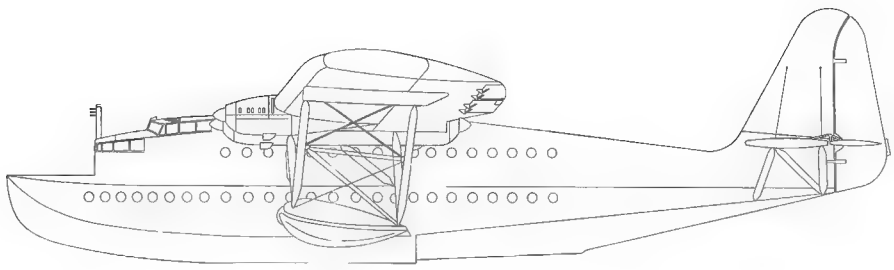
In November 1940, the State Secretariat for Air recovered the *Lieutenant de Vaisseau Paris* from the French Admiralty with the intention of setting up an air link between France and Madagascar. The German authorities agreed that the aircraft should be put back into working order, but the work dragged on. The aircraft flew again from Berre on 18 August 1942 with three great specialists of the aircraft: *Commandant* Bonnot and the pilots Jean Gonord and Pierre Crespy, who had not flown on board it for several years. After a dozen test flights following adjustments, a final test flight of one hour was made on 8 October 1942. This was to be the last flight of the eventful career of the *Lieutenant de Vaisseau Paris.*

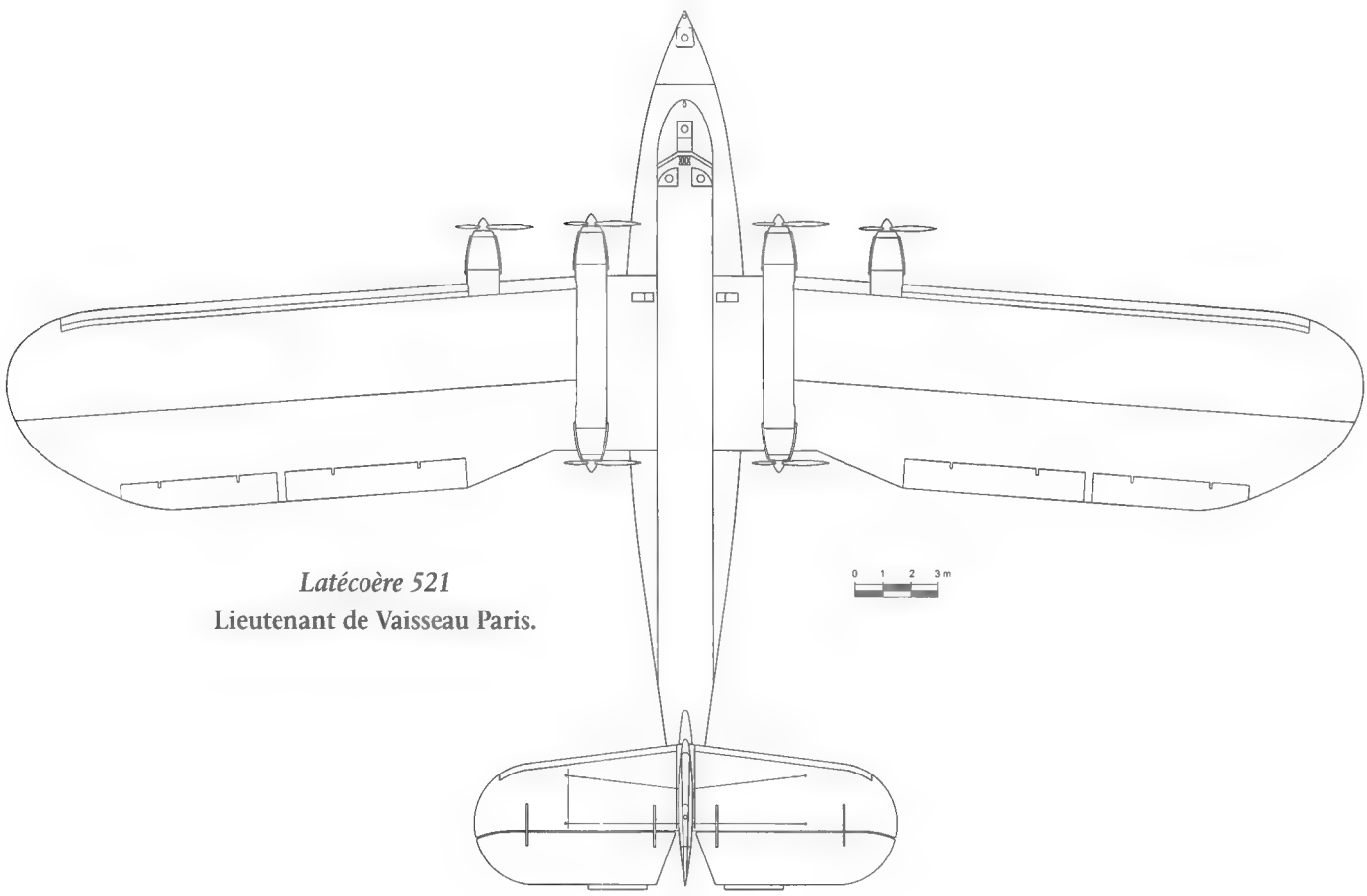
LV Paris *of Exploration Flight E6 at Lanvéoc-Poulmic. The forward part of the hull has been completely re-designed.*

On 25 August 1944, the Naval Air Base at Berre was once more in the hands of French sailors. It had been completely wrecked by the retreating German forces. Beneath the wreckage of the collapsed hangars were found the remains of about 20 LATE 298s, the *Ville de Saint-Pierre* and its companion in arms, the *Lieutenant de Vaisseau Paris*.

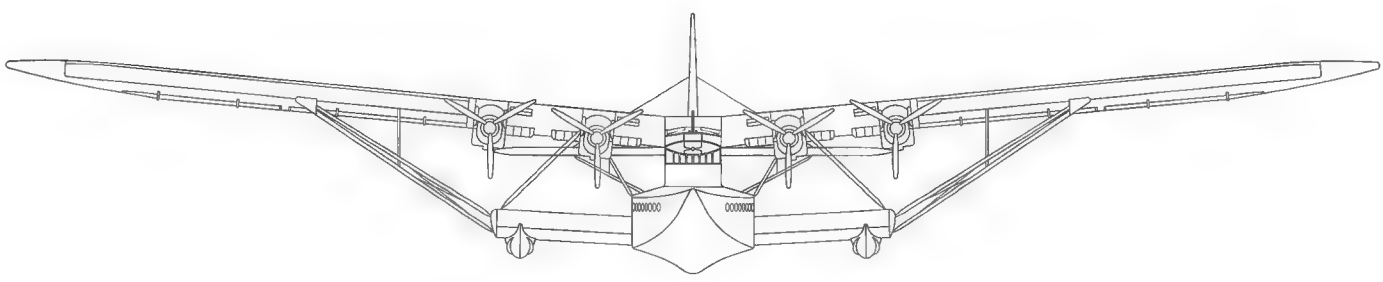
The carcass of the aircraft was still there in February 1945, waiting to be scrapped.

Civil programme
Order N° 281/1 of 22/8/31
Manufactured: One
In *Aéronautique Navale* service: One (*Lieutenant de Vaisseau Paris*)
Units: 12E, E6/6E (1939 – 1940)
General Characteristics:
Metal hulled six-engine monoplane flying boat.
Length: 31.62 m (103.74 ft)
Span: 49.314 m (161.79 ft)
Height (above ground level): 9.07 m (29.75 ft)
Wing Area: 330 m² (3,552 sq ft)
Empty Weight: 19,145 kg (42,207 lb)
Laden Weight: 42 tonnes (92,594 lb)
Propellers: Hamilton (electric)
Engines: 6 x 860 hp Hispano-Suiza 12Y 27 (military version)
Crew: 14
Maximum Speed: 251 km/h (at 32 tonnes auw) / 156 mph (at 70,548 lb)
Range: 6,300 km (3915 miles) in still air
Offensive Armament: 4 x I2 150kg (330 lb) bombs alongside hull
Defensive Armament: 4 x 7.5mm Darne machine guns





Latécoère 521
Lieutenant de Vaisseau Paris.



Latécoère 522

Ville de Saint-Pierre

The single Latécoère 522 did not correspond to any precise *Aéronautique Navale* programme. At the most, it could be considered as being assimilated into the programme for large 'Cruiser' sea-planes MP/CPT 10 of May 1935.

On 7 April 1936, the Air Ministry ordered four six-engine flying boats powered by 880 hp Hispano-Suiza 12 Ydrs engines from SILAT (Latécoère).

The first three were Type 523 aircraft destined for high sea Exploration duties for the *Aéronautique Navale*. The fourth (Type 522) was for commercial use and not fitted out for military duties. These flying boats were direct extrapolations of the LATE 521 *Lieutenant de Vaisseau Paris*, having the same general configuration.

However, their forward hulls were considerably modified, having a rounded bow. As a result of social unrest under the *Front Populaire* and the priority accorded by the authorities to the military 523 version, completion of the 522 was subject to considerable delay. As the Latécoère factory at Toulouse-Montaudran was occupied with other programmes, construction of the LATE 522 was carried out at two distinct sites. The wings were manufactured at the Toulouse parent factory and the hull at Anglet, near Biarritz, where Pierre-Georges Latécoère had begun to build a new factory in 1937.

The Ville de Saint-Pierre *with Flight E6 at Lanvéoc-Poulmic. Note the external bomb racks. (DR).*

Latécoère 522 Ville de Saint-Pierre *of* Air France Transatlantique, *registered F-ARAP, photographed in front of the Latécoère factory at Biscarrosse before the war.*

At the beginning of March 1938, the hull was transferred by road from Anglet to Biscarrosse. There also, assembly dragged on, notably due to non-delivery of the Hispano-Suiza 12 Y 37 engines. Thus, the aircraft only managed to make its maiden flight at Biscarrosse on 20 April 1939, flown by Pierre Crespy.

Registered F-ARAP, it was now given the name *Ville de Saint-Pierre* and bore the insignia of *Air France Transatlantique*, its future operator. Testing, now considered routine, was quickly ended on 22 May after only eight flights.

On 6 June 1939, Guillaumet made a first long distance flight from Biscarrosse to Foynes (Ireland), following which the *Ville de Saint-Pierre* emulated the *Lieutenant de Vaisseau Paris* by making four transatlantic crossings (Biscarrosse-New York and back) between June and August 1939, each time with Guillaumet at the controls.

The main exploit however, was taking off from Biscarrosse on the night of 16 June with the help of a flare path on the water's surface, a first for a commercial flying boat of this weight, using a technique already employed by the Navy.

Along with a number of other commercial seaplanes, the *Ville de Saint-Pierre* was requisitioned by the military on 7 September 1939 and handed over to the Navy. With its homologue, the *Lieutenant de Vaisseau Paris*, it integrated the newly created Flight 12E and was based at Lanvéoc-Poulmic.

Lieutenant de Vaisseau Couralet was appointed to command this unit and also the *Ville de Saint-Pierre*. The civilian crew was also mobilised, including Henri Guillaumet, who flew the aircraft to Lanvéoc-Poulmic on 11 September.

After this, the *Ville de Saint-Pierre* was quickly converted for military use at Biscarrosse by fitting machine gun hatches in the hull, adding eight GPU bomb racks and also radio equipment. It was also repainted in dark blue-grey but still retaining its name plate on the forward hull. During this period, the civilian crew was placed at the disposal of the Air Ministry, giving way to military personnel who had now been trained to operate the aircraft. On 10 November 1939, the *Ville de Saint-Pierre* finally joined Flight E.6 (12E having been dissolved) under the command of *Capitaine de Frégate* Bernard.

Its first wartime mission was flown on 21 November entailing a ten hour exploration flight in search of enemy submarines. After several sea patrols, the aircraft returned to Biscarrosse at the beginning of January 1940 where its 12 Y 37 engines were replaced by 12 Y 27s, these being in service with the *Aéronautique Navale*.

In February however, and much to the annoyance of the military who could not see the point, the LATE 522 was placed at the disposal of the Air Ministry's Air Transport Directorate. From February to May 1940, the aircraft was overhauled at the Biscarrosse factory and its military equipment removed.

At dawn on 25 June 1940, despite the Armistice being already in operation for several hours, Guillaumet took off from Biscarrosse on board the LATE 522 for Port-Lyautey in Morocco, reached without stopping. Once again attached to this aircraft, he carried out five exploration missions during July. But on 2 August, *Capitaine de Frégate* Bernard, commander of 6.E (formerly E.6), to which the *Ville de Saint-Pierre* belonged, was informed that the aircraft was due for a general overhaul and as a result would be withdrawn from operational service yet again. It was therefore flown by Guillaumet to Bizerte on 9 August and on to Marignane the following day. This would be the last occasion on which this legendary pilot flew the aircraft since he was lost over the Mediterranean on 27 November 1940 on board the Air France Farman *Le Verrier* (F-AROA), shot down by enemy fighters.

This flight brought to a close the short military career of the *Ville de Saint-Pierre*, which had flown fewer than thirty operational missions. As would be the case later on with the Latécoère 611 *Achernar*, it became one of the 'blockade runners' on special detachment to Air France.

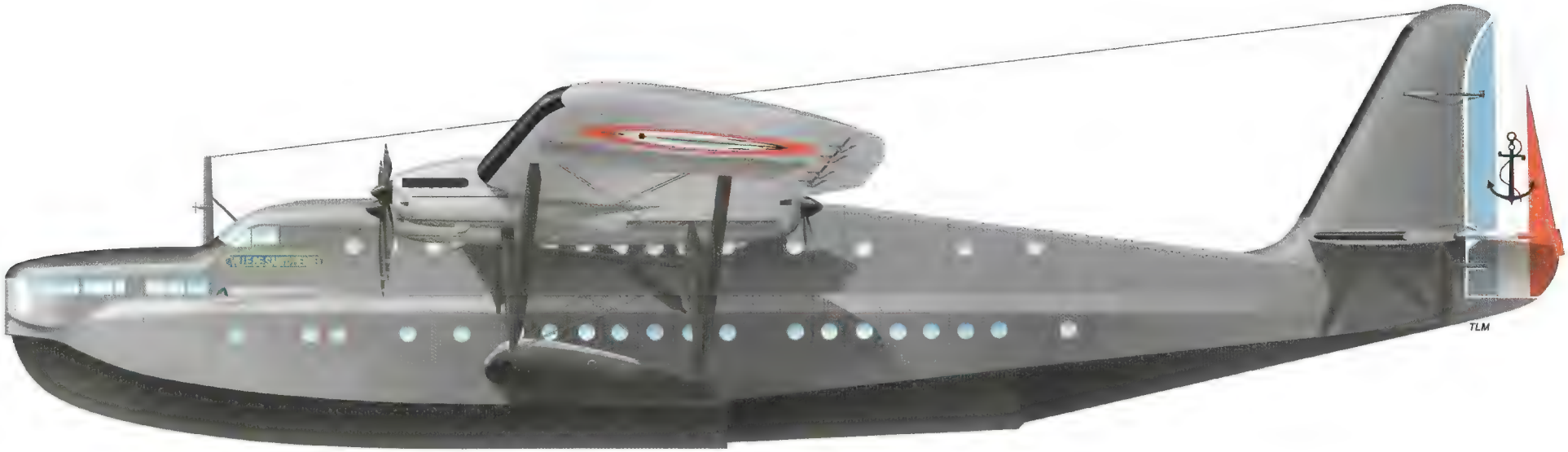
Following the Armistice, and for evident strategic reasons, the British set up a strict blockade around the positions occupied by the French at Djibouti. This zone had been cut off from metropolitan France for several months and the Vichy government decided to resupply it by air.

On 11 November 1940, the *Ville de Saint-Pierre* took off from Marignane under the command of Pierre Codos and reached Djibouti in several stages, flying on from there to Madagascar and finally to Diego-Suarez, where it took on Italian prisoners to be flown back to France. At the beginning of February 1941, during a second voyage to Djibouti, it had to make a forced landing off Eritrea due to a fuel shortage, resulting in damage to its hull. After summary repairs at Djibouti, it returned to Marignane on 27 February. This would be its final flight.

In the autumn of 1943, the *Ville de Saint-Pierre* was indicated as disassembled at the Berre naval base where it was undergoing a lengthy major overhaul.

At the end of August 1944, the Germans blew up the large hangar in which it was stored along with the *Lieutenant de Vaisseau Paris*. Like the latter, it was heavily damaged and no longer usable, later being scrapped.

F-ARAP in its wartime markings.

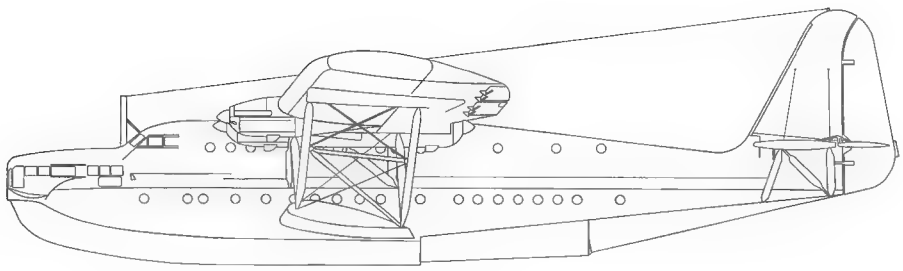


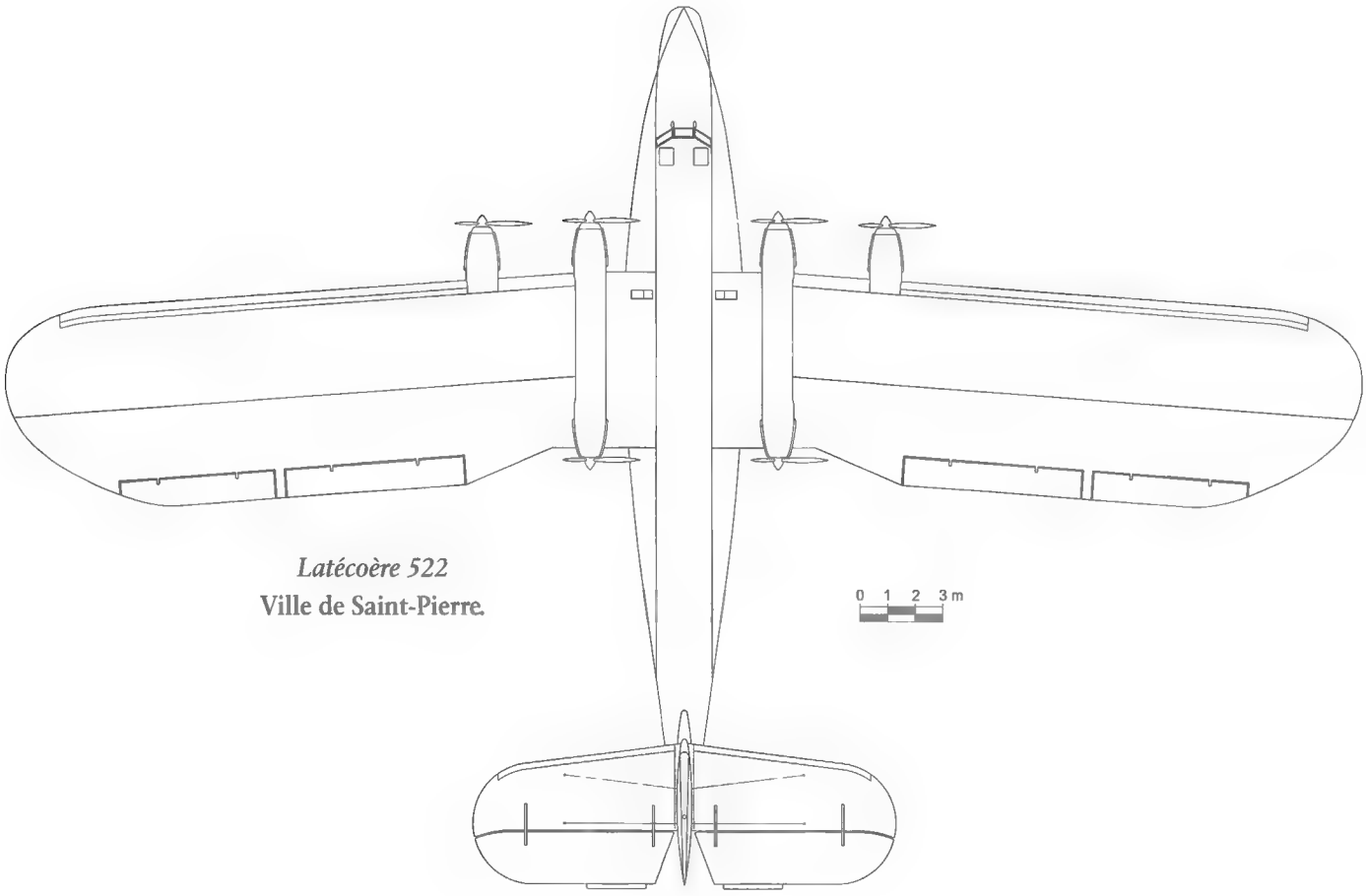
Latécoère 522 Ville de Saint-Pierre *(Exploration Flight E6 – 1939 – 1940).* Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.* Gris bleu clair *(light grey blue) on the wings and engine nacelles.*

A propaganda photograph showing the 'militarised' Latécoère 522 at Lanvéoc-Poulmic. Note the dorsal turret. (DR).

Civil programme
Order N° 88/6 of 7/4/36
Manufactured: One
In *Aéronautique Navale* service: One (*Ville de Saint-Pierre*)
Units: 12E, E6/6E (1939 – 1940)
General Characteristics:
Metal hulled six-engine monoplane flying boat.
Length: 31.77 m (104.23 ft)
Span: 49.314 m (161.79 ft)
Height: 9.07 m (29.75 ft)
Wing Area: 330 m² (3552 sq ft)
Empty Weight: 21,205 kg (46.749 lb)
Laden Weight: 43,080 kg (94.975 lb)
Engines: 6 x 920 hp Hispano-Suiza 12Y 27 (military version)
Maximum Speed: 256 km/h (at 3,000 m and 32 tonnes) / 159 mph (at 9842 ft and 70,548 lb)
Climb Time (32 tonnes/70548 lb): 4min 48s (1,000 m/3281 ft), 14min 6s (3,000 m/9842 ft), 52min 45s (6,000m/19,685 ft)
Range: 5,878 km at 121 km/h (3652 miles at 75 mph)
Offensive Armament: 8 x 75 kg (165 lb) G2 bombs
Defensive Armament: 1 x 7.5 mm Darne machine gun

The crew posing on the Ville de Saint-Pierre at *Lanvéoc-Poulmic. (DR).*





Latécoère 522
Ville de Saint-Pierre.

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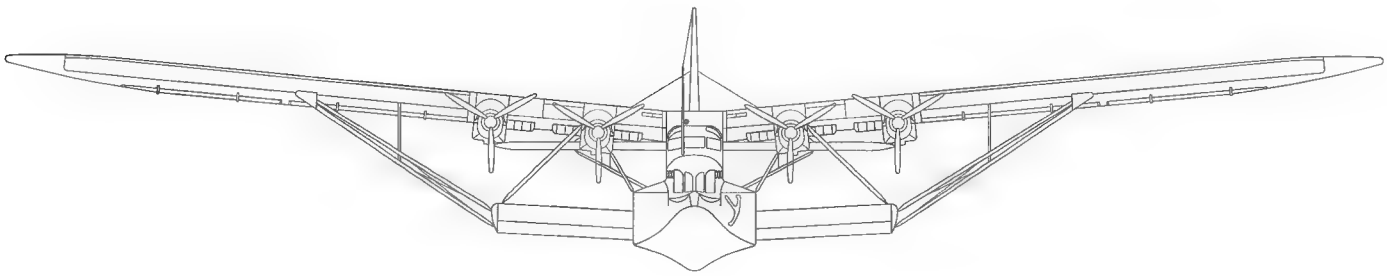


Latécoère 523

Aldébaran – Altaïr – Algol

The Air Minister, *Général* Denain, had flown on board the LATE 521 *Lieutenant de Vaisseau Paris* and was so highly impressed with its capacity that it was decided to develop a '521 military series'.

Three examples of the LATE 523 were ordered by the Navy in July 1935, despite some reticence on the part of the Admiralty who found the aircraft to be slow, too heavy and relatively expensive.

It did not correspond to any precise technical programme but, like the LATE 522, its characteristics, especially its great range, brought it close to the requirements of programme MP/CPT 10 of May 1935, calling for 'a Cruiser seaplane'. Thus, when the Air Ministry contract was finally approved in April 1936 after considerable delay, the Latécoère 523 was from then on designated by the Seaplane Section of the Air Ministry as belonging to the 'Cruiser class' along with the Breguet 730, CAMS 141, Latécoère 610 and Lioré & Olivier 440.

The similarity of the aircraft to the commercial LATE 521 was evident. Thus, in spite of the presence of armament and different engines, it kept to the form and general design of the '*six-engine strutted sesqui-plane with a central hull*' as designated by the manufacturer. Of course, the internal arrangements were different, with great attention being given to the comfort of the crew considering that long missions of up to twenty hours were envisaged (double washrooms, a kitchen area, couchettes for nine crew members simultaneously, etc.).

The question of armament was subject to long discussions and it was finally considered necessary to fit oblique internal bomb bays to allow sideways release of bombs weighing up to 225 kg each.

Mounting of a 25 mm naval cannon, the most powerful weapon available at the time, was envisaged from the beginning. This cannon had been the object of systematic testing during 1938 on a CAMS 110 flying boat. In addition to the cannon, it was finally decided to fit five 7.5 mm Darne machine guns, one of which was to fire through a hatch in the lower hull, near the second step[1].

Latécoère 523 Altaïr *during initial testing during 1938, shown in front of Latécoère's base on the lake at Biscarrosse.*

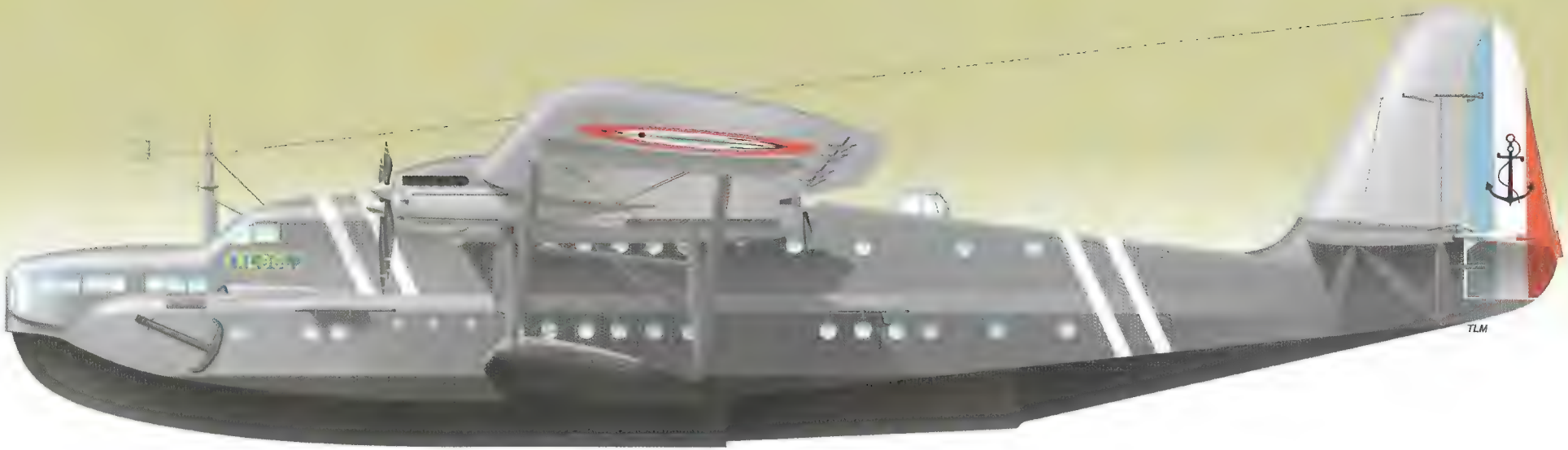
1. The fitting of a machine gun underneath the hull was not unique to the Latécoère 523. For example, this arrangement can be found on other seaplanes such as the French Potez-CAMS 141 and Loire Nieuport L.N.10, as well as the German Dornier 26.

Latécoère 523 Aldébaran, *recognisable by its single white band forward and aft, on the water at Lanvéoc-Poulmic.*

At the beginning of 1938, the Admiralty gave the LATE 523s distinctive names of constellations beginning with the letter 'A', as customary for Exploration seaplanes. The three Latécoère 523s made their first flights from Biscarrosse in the hands of factory pilots Pierre Crespy and Jean Gonord respectively on 20 January 1938 (N° 1/*Altaïr*), 16 June (N° 2/*Algol*) and 21 October (N° 3/*Aldébaran*). The tests were satisfactory.

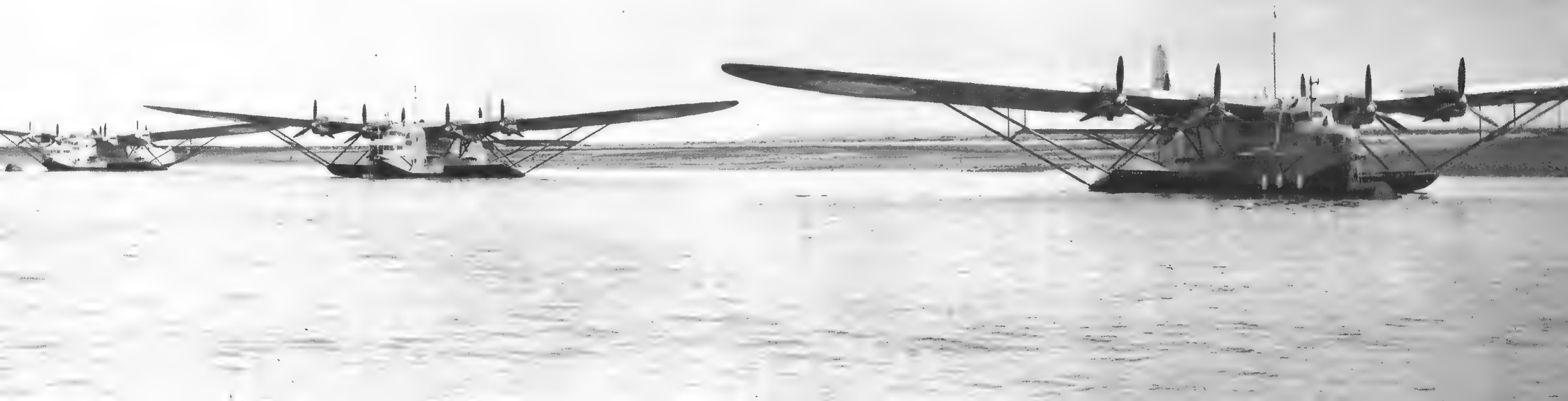
The LATE 523 was capable of maintaining height on four engines at full power, a useful feature in wartime. However, on the water it had a tendency to submerge one sponson in wind conditions and it did not like heavy swells, either at its mooring or when taking off, and this despite its ample hull. After testing of *Altaïr* by the CEPA at Saint-Raphaël, *Algol* was the first of the aircraft to enter service with E6, a new Exploration flight based at Berre, under the orders of *Capitaine de Corvette* Bernard.

Latécoère 523 Algol *in flight, recognisable by the twin bands forward and aft. Note the arrangement of the six engines, identical to the civil version* L.V. Paris.

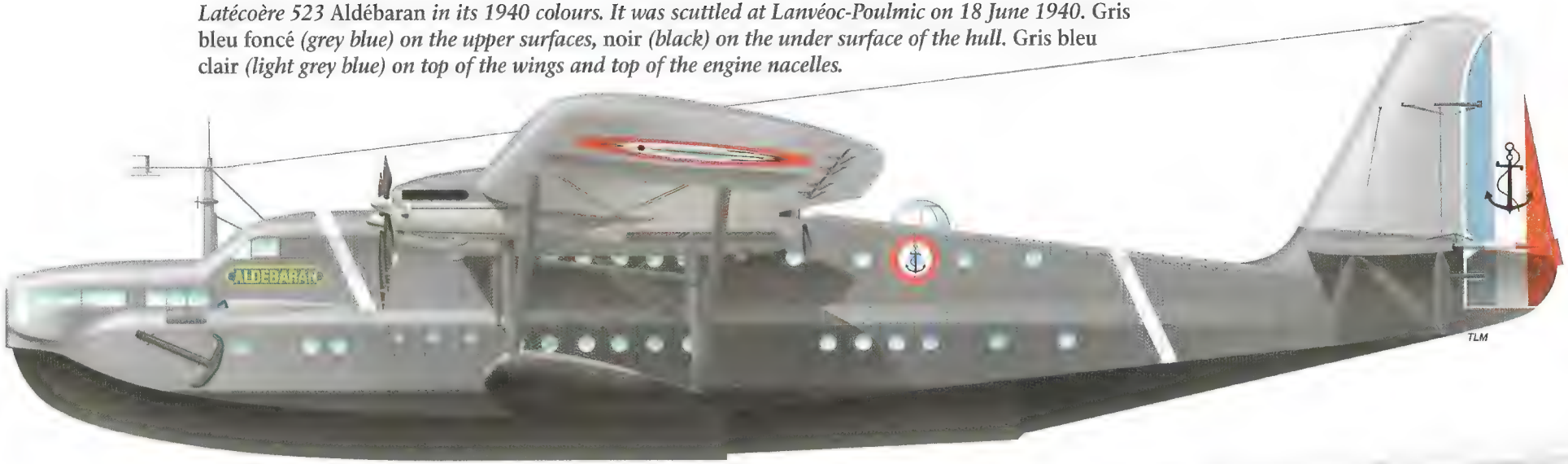


Latécoère 523 Algol *(Lanvéoc-Poulmic – 1939). Sunk by gunfire on 18 September 1939.* Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.* Gris bleu clair *(light grey blue) on top of the wings and top of the engine nacelles.*

A fine view of all the three Latécoère 523s constructed, seen here on the water at Lanvéoc-Poulmic in 1939. Aldébaran *is on the right,* Altaïr *in the middle and* Algol *on the left, all belonging to Exploration Flight E6.*



Latécoère 523 Aldébaran *in its 1940 colours. It was scuttled at Lanvéoc-Poulmic on 18 June 1940.* Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.* Gris bleu clair *(light grey blue) on top of the wings and top of the engine nacelles.*



Latécoère 523 Aldébaran *on the factory's slip at Biscarrosse (1939).*

An attempt at towing Algol *on 18 September 1939 after it had run out of fuel off Ouessant. It would finally be sunk by gunfire from the French Navy. Note the damaged starboard wing.*

The first mission for the three aircraft of this unit was a Mediterranean cruise in January 1939 to verify that all was in working order. This was carried out in conjunction with the Mediterranean Fleet with calls at Bougrara and Bizerte. In April 1939, the three aircraft were allocated distinguishing markings to aid visual identification: thus, *Aldébaran* was given a white band on the front of the hull and another at the rear, two bands in similar positions for *Algol* and none at all for *Altaïr*.

In June 1939, *Algol* carried out firing trials in flight and on the water with the dorsal 25 mm cannon. There were repeated problems with this weapon as well as operating difficulties. As a result, fitting the cannon to the LATE 523s was abandoned in favour of a turret with a single Darne machine gun.

On the declaration of war, Flight E6 was based at Lanvéoc-Poulmic where the *Aéronatique Navale*'s largest flying boats were concentrated in order to ensure anti-submarine patrols and convoy escort duties in this highly strategic sector. On 12 September 1939, *Algol* dropped four bombs on a diving enemy submarine without success. Unfortunately, during its fifth wartime patrol on 18 September, after a 12 hour 40 minutes exploration mission, the aircraft was forced to come down in the Iroise Sea, 15 nautical miles off Ouessant, due to lack of fuel. This was due to excessive consumption resulting from one of the rear propellers being kept on fine pitch!

Attempts to tow the aircraft by the torpedo boat *Le Boullonnais* failed and the hull was severely damaged during the operation. It was finally sunk by cannon fire by surface ships trying to protect it. On 22 May, *Aldébaran* was also a victim of engine failure and was forced down at sea but on this occasion, it was successfully towed back to Lanvéoc. Out of service and undergoing repairs on 18 June 1940 when the base was being evacuated, it was scuttled in the roadstead to prevent it falling into the hands of German troops who were then pouring into Brittany[2].

On the same day, *Altaïr*, by now the sole survivor of its type, took off for Biscarrosse and reached Port-Lyautey the following day. On 1 August 1940, it was attached to Flight 6E (ex-E6) along with the three other large 'Cruiser' flying boats *Antarès*, *Lieutenant de Vaisseau Paris* and *Achernar*. In conformity with the decisions of the occupying powers, it was immobilised for a time at Bizerta-Karouba and then flown back to Berre in October 1940 to undergo a major overhaul.

Following a long period of works, resulting from difficulties in obtaining spare parts, it re-entered service with Flight 4E at Dakar in June 1941 in the same role of convoy protection and search for submarines. However, the condition of its airframe continued to deteriorate to a point at which part of the upper wing surface fabric came off in flight in February 1942, leading to the aircraft being grounded. In addition, the sponsons were heavily corroded and, due to lack of

2. One can only dream about the possibility of bringing this impressive wreck to the surface. It is still lying in the Lanvéoc-Poulmic roadstead and its position is said to be known to local divers...

lifting equipment, it could not be moved into the base's hangar for protection. Its withdrawal from service had been envisaged for the first quarter of 1943, but due to its age and the lack of spare parts, this was brought forward to August 1942 at Dakar, after 700 flying hours. Of the three Latécoère 523s which had entered service, it had flown the longest wartime mission of 16h 30min on convoy protection out of Saint-Etienne in July 1941, a fine performance for a flying boat designed a good dozen years earlier.

Air Ministry Contract

N° 88/6 of 7/4/36 (joint contract for 3 LATE 523 and 1 commercial LATE 522).

Manufactured: Three

In *Aéronautique Navale* Service:

Three (1938 – 1942)

Units: 6E, 4E

N° 1 (*Altaïr*, codes E6.1 and E4.1)

N° 2 (*Algol*, code E6.2)

N° 3 (*Aldébaran*, code E6.3)

General Characteristics:

Metal hulled six-engine monoplane flying boat.

Length: 31.77 m (104.23 ft)

Span: 49.31 m (161.79 ft)

Height (above ground level): 9.07 m (29.75 ft)

Wing Area: 330 m² (3552 sq ft)

Empty Weight: 22.34 tonnes (49,251 lb)

Laden Weight: 42 tonnes (92,594 lb)

Propellers: Three bladed Ratier 1557/1558 (pitch variable in flight)

Engines: 6 x 885 hp Hispano-Suiza 12Y 27

Practical Ceiling: 5,000 m (32 tonnes) / 16,404 ft (70,548 lb)

Maximum Speed: 260 km/h (32 tonnes) / 161 mph (70,548 lb)

Cruising Speed: 185 km/h (115 mph)

Climb Time: 37 min [3,000 m (9842 ft) at 40 tonnes (88,185lb)]

Take-off Time: 46 sec [40 tonnes (88,185 lb)]

Range (still wind): 3,550 – 4,770 km (2206 – 2964 miles)

Crew: 17

Offensive Armament: 4 x I2 150 kg or 8 x 75kg (165 lb) G2 bombs in lateral bomb bays in hull sides

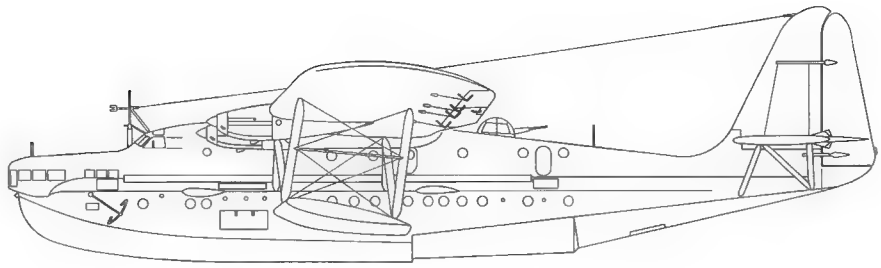
Defensive Armament: 5 x 7.5mm Darne machine guns (1 x 25mm cannon replaced by quadruple Darne in dorsal turret on Altair)

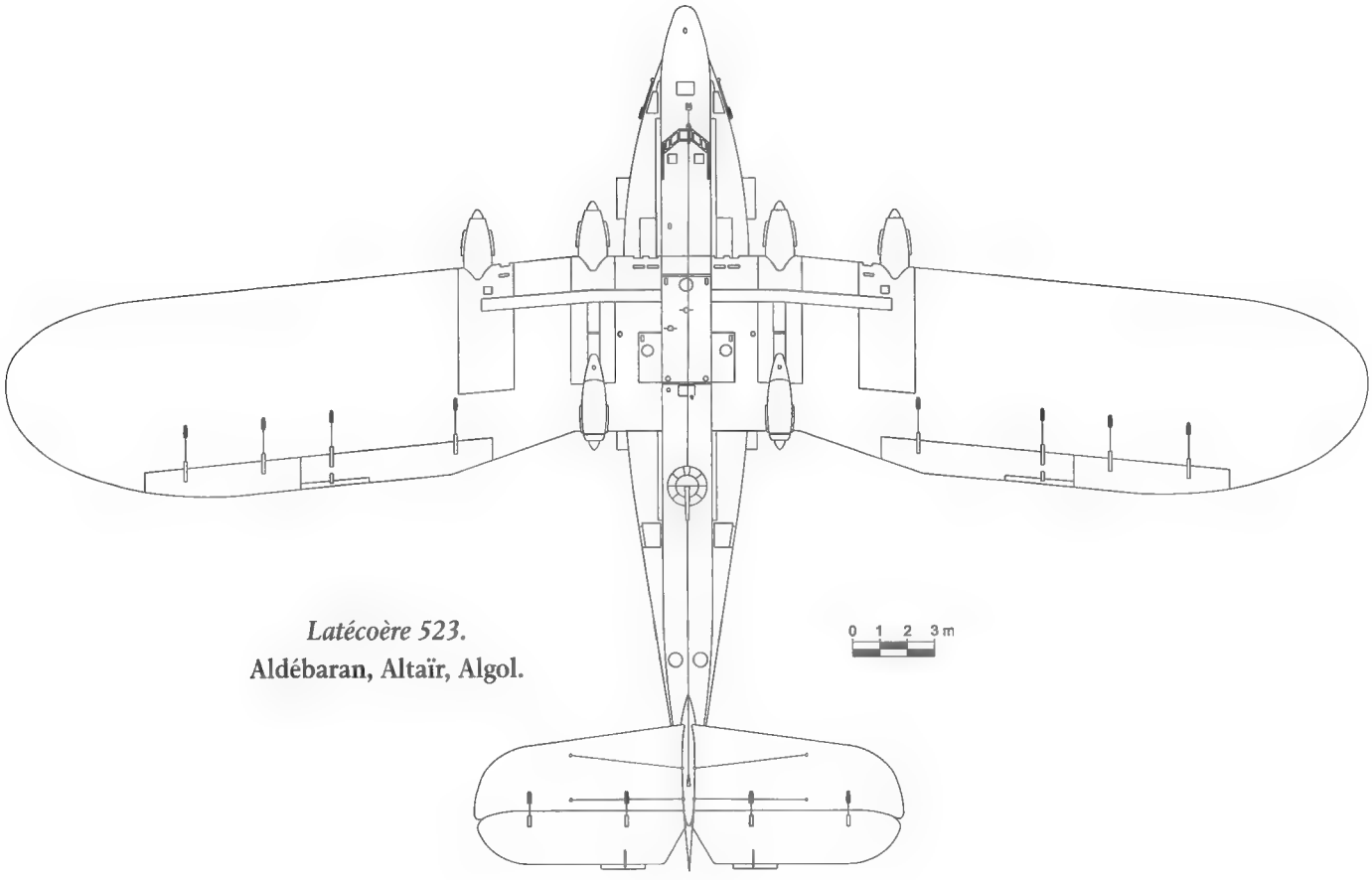
Latécoère 523 Altaïr *(Exploration Flight 4E – 1941).* Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.* Gris bleu clair *(light grey blue) on top of the wings and top of the engine nacelles.*

Algol *being protected by a torpedo boat after its forced ditching. They are being overflown by a Breguet* Bizerte *of Flight E2, its port float being visible to the right of the photograph (18 September 1939).*

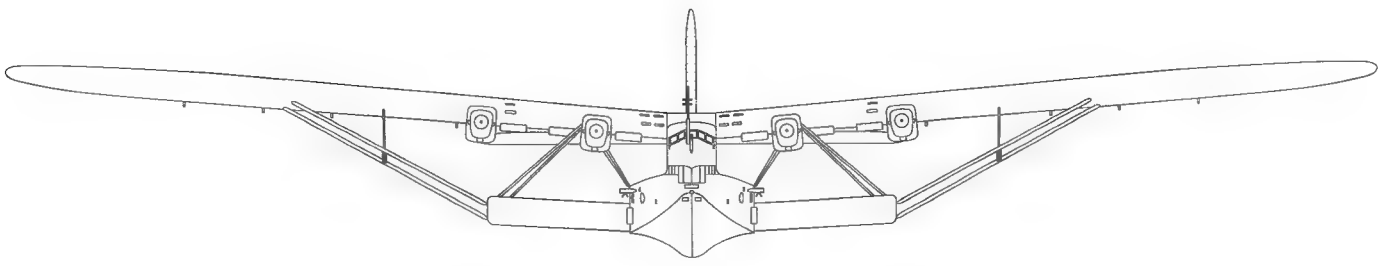
The spacious forward glassed-in area on Latécoère 523 Altaïr. *The crew member is holding a Type T.O. (Optical Transmission) signalling lamp. (DR).*

A magnificent view of the three Latécoère 523s, with Aldébaran *to the front (June 1939).*





Latécoère 523.
Aldébaran, Altaïr, Algol.



Latécoère 611 *Achernar*

The Latécoère 611 corresponded to the requirement for a flying boat of the '*Croisiére*' category as outlined in Technical Programme MP/C.P.T.10 dated 1st May 1935. Of the eight projects submitted, four were finally selected by the CEPANA. These were the Breguet 730, CAMS 141, Lioré & Olivier 440 and Latécoère 610. The four-engine 611 was a development of the latter, being ordered in March 1937 through adding a clause to the original contract for the type 610.

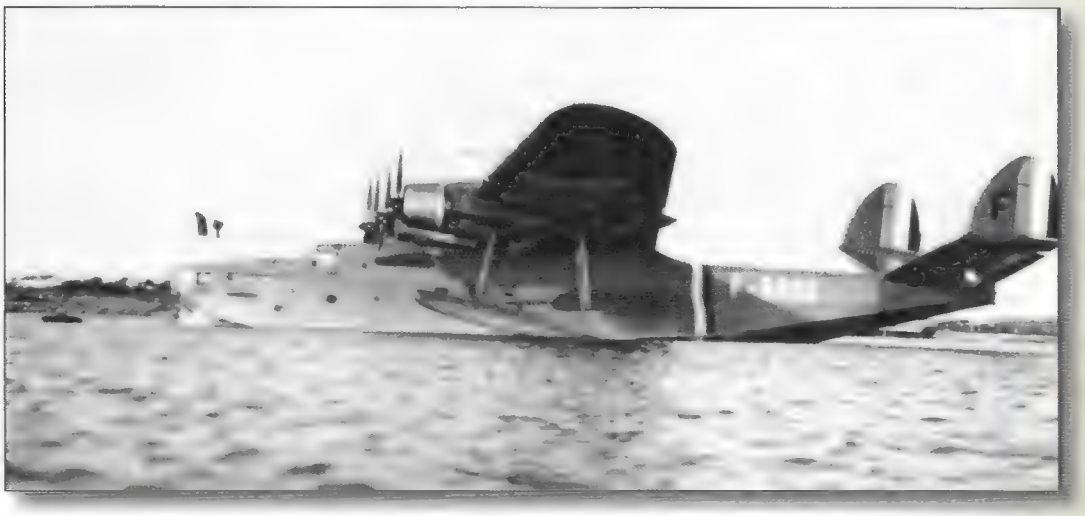
The aircraft incorporated two interesting innovations, a horizontal tail plane formed in a 'V', sometimes referred to as 'butterfly' (this feature was continued on the even larger Latécoère 631 and became virtually the firm's trademark), and retractable floats intended to keep parasitic drag to a minimum in order to meet performance requirements.

Unfortunately, as with the 522, construction of the Latécoère 611 was considerably delayed by labour unrest connected with political events in France in 1936 and difficulties in selecting and obtaining the types of engines to be fitted. Finally, it was decided to fit the aircraft with Gnome & Rhône 14 N 4/5s each developing more than 1,000 hp. Faced with these problems, the aircraft did not take to the air until 9 March 1939, two years after it was ordered. The first flight took place at Biscarrosse with Pierre Crespy at the controls, assisted by Vergès as mechanic. It was taken on charge by the Navy in the following month and given its distinctive name, *Achernar*[1].

This act was a mere formality since the aircraft remained at Biscarrosse to continue its trials right through 1939 under the supervision of *Capitaine de Frégate* Protche, the naval officer responsible for supervising testing of '*Croisière*' class flying boats. On the declaration of war, *Achernar* was still being evaluated by the manufacturer after an engine change. Testing officially ended in April

1. In reference to the first magnitude star in the Eridanus constellation.

Achernar *crew commanded by* L.V. *Husson at Berre in September 1941. Note the temporary undercarriage for manoeuvring on land, replacing the original trolley.*



Latécoère 611 Achernar *just out of the Latécoère factory, Biscarrosse (1939).*

Latécoère 611 Achernar *as a 'blockade runner' bearing a civil registration of convenience (F-BACK), during its voyage from Berre to Djibouti and back (May 1941).*

1940 with machine gun firing and flights lasting up to 12h 50 at a time, but in fact consisting of four flights totalling 33h 42, without refuelling.

A month earlier, the Navy, in the person of *Contre-Amiral* Lartigue, requested the delivery of the LATE 611 fitted with new engines giving greater power so as to avoid having to buy American 'Exploration' class flying boats which would be *'very costly in terms of US dollars'*[2]. Thus, an official order was signed in May providing for the supply of ten series production Latécoère 611s, now designated as type 612, fitted with American Pratt & Whitney S.3.C4.G engines.

As a result, the S.T.Ae left *Achernar* at Latécoère's disposal for transformation into a type 612 by modifying its structure to take the Pratt & Whitney engines and verify its performance, instead of delivering it directly to the Navy. However, for technical reasons, this conversion was abandoned and it was decided to refit the Gnome & Rhône engines urgently, the German invasion having already begun.

Meanwhile, at Toulouse-Montaudran, the Latécoère company had begun to set up the production line for the ten series version Latécoère 612s which had been ordered, beginning with the floats. But under the circumstances, this activity came to a sudden stop in June. At Biscarrosse, *Lieutenant de Vaisseau* Husson was named as commander of the aircraft on 21 June 1940 and he made an initial test flight on the 23rd, before evacuating the base on the following day to gain Port-Lyautey after an 11 hour flight. On 29 July, the front of the aircraft was damaged when it drifted onto rocks at Oued Sébou in Morocco.

On 1st August 1940, it joined Flight 6E. It returned to Berre on 5 October 1940 to undergo a long list of repairs (hull, sea rudder) and to undergo some modifications (ailerons, armament). It would not take to the air again until March 1941. In May, it took on the role of 'blockade runner',

2. To counter insufficient production by French factories, the Admiralty was obliged to order 30 Consolidated PBY 28/5 Catalina flying boats in October 1939.

flying from Berre to Djibouti via Tripoli to relieve the local population, by now cut off from metropolitan France by the British, bringing in medical supplies and mail.·

Even though the crew was composed entirely of naval personnel, the aircraft was given a more discreet civil registration (F-BACK) and flew under the colours of Air France and under the 'flag of convenience' of the Directorate of Civil Aviation. During this mission, the aircraft was damaged on leaving Djibouti (port float bent back and hull torn) but it was able to get back to Berre in May after summary repairs.

In October 1941, the aircraft left Berre for Dakar, where it was allocated to Flight 4E. In spite of the difficulties experienced by aircraft of this unit, due to a recurring shortage of spares arising from the distance from metropolitan France and administrative complications coming from the Armistice Commission, *Achernar* continued carrying out escort and convoy protection missions off Dakar.

In 1942, the Naval Commander in French West Africa went so far as to state: 'Achernar *is the best aircraft in 4E*'. Following the Allied landings in North Africa, the aircraft continued to fly alongside the Allies.

In May 1943, its engines were replaced by Gnome & Rhône 14 N 42/43s and it had already totalled close to 270 flying hours on war missions since arriving at Dakar.

In January 1944, it served as a VIP transport for the Brazzaville conference. During the liberation of Provence, under the command of *Officier des Equipages* Larmigny, it came under light arms fire when trying to put down at Saint-Raphaël, though the base was supposed to have been evacuated by the Germans. The aircraft quickly took off again and went on to Saint-Tropez, where *Achernar* finally returned to French waters.

In November 1944, it joined the '*Flotille de Transport* 9 F.T.R' based at Saint-Mandrier. This unit's designation was changed to 30S in December and, as well as *Achernar*, it included Breguet 730 *Vegan*, six Dornier 24s and the only remaining Breguet *Bizerte*. The 611 made a trip to Lebanon in the summer of 1945 and in March 1946, it flew to Madagascar via Cairo, Khartoum, Kisumu and Mombasa. As from July 1946, it formed part of Flight 33S along with the four Breguet 730/731s. This unit was designated for maintaining links with French colonies. In October of that year, it maintained liaison between Toulon and Dakar.

The Latécoère 611 with Flight 4E at Dakar.

Latécoère 611 Achernar. *(Flight 30S – Saint-Mandrier – 1945).* Gris bleu clair *(light grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.*

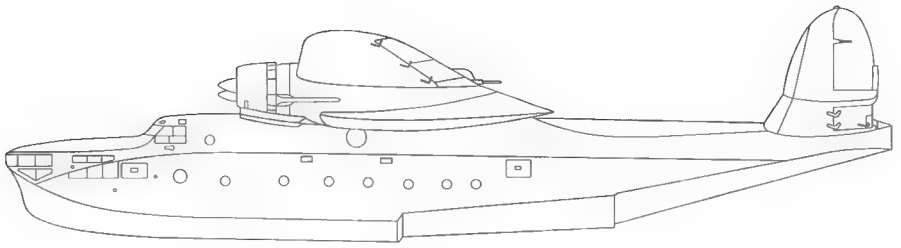
Latécoère 611 Achernar *with Vichy markings of Exploration Flight 4E. Dakar 1942.* Gris bleu clair *(light grey blue) on the upper surfaces,* noir *(black) on the under surface of the hull.*

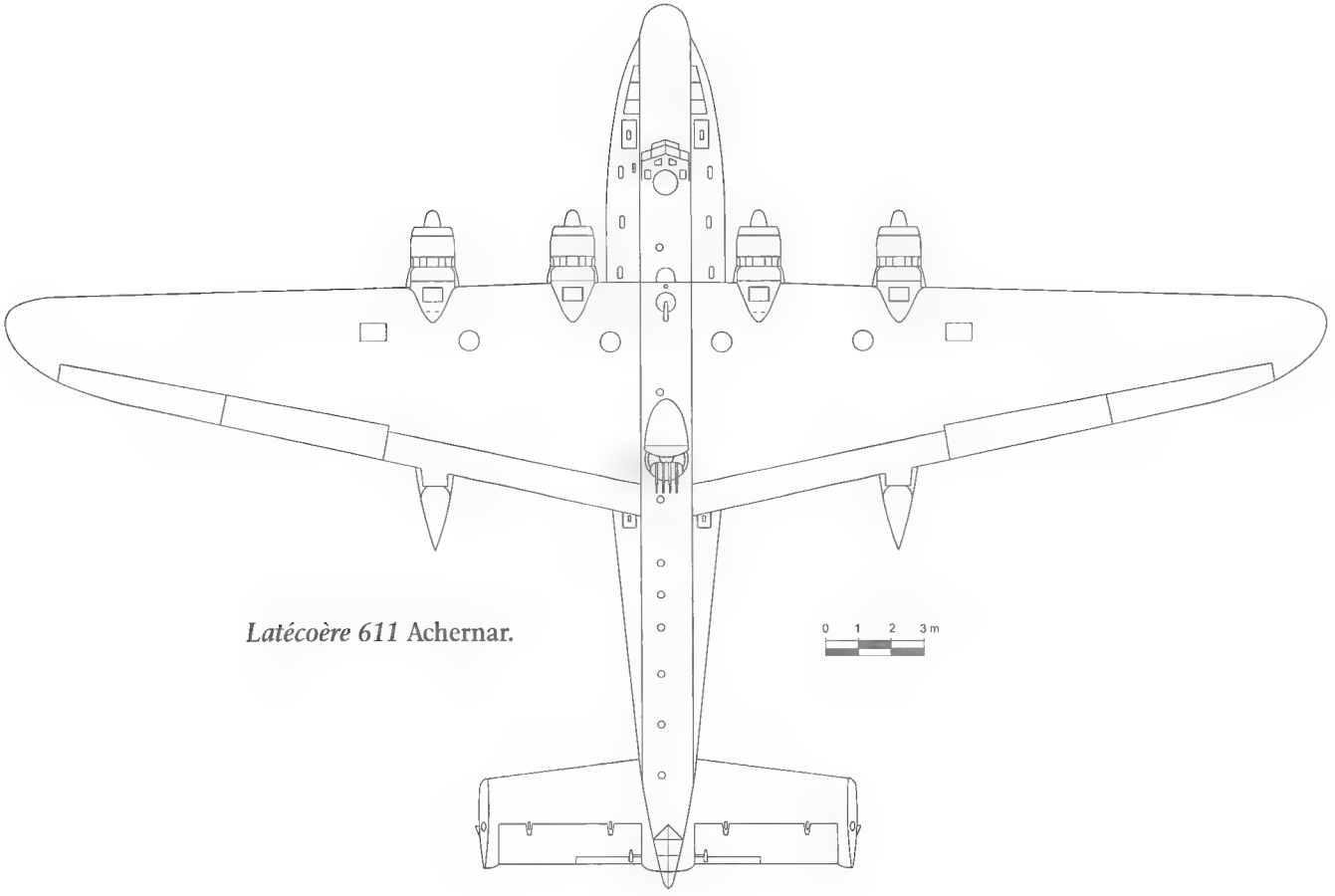
The Latécoère 611 continued in service until it was definitely struck off in October 1947 due to its age, before being dismantled at Saint-Mandrier naval air base after seven years operational service and 1,600 flying hours. By then it had been out of service for several months, its last flight taking place on 1st July 1947.

Three days earlier, it had flown over Paris, escorted by *Aéronavale* fighters, in a fitting tribute to French achievements in the air and to a faithful old servant of the *Aéronautique Navale*.

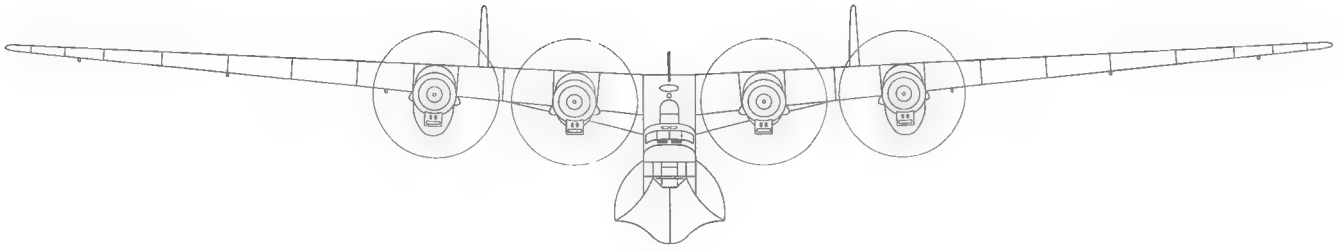
Air Ministry Contracts
N° 875/0 and N° 496/6 of 19/6/36 – (order for one Latécoère 610).
Clause added to contract 496/6 on 18/3/37 (order for one Latécoère 611, replacing that for the 610).
N° 496/6 and N° 875/0 of 23/5/40 (order for 10 Latécoère 611/612 – cancelled).
Manufactured: One
In *Aéronautique Navale* Service: One (1940 – 1947)
Units: 6E, 4E, 9 F.T.R., 30S, 33S.
Distinctive Name: *Achernar*
General Characteristics:
Four-engine metal hulled monoplane flying boat
Span: 40.55 m (133 ft)
Length: 27.05 m (88.70 ft)
Height: 7.33 m (24.04 ft)
Empty Weight: 16,000 kg (35,274 lb)
Laden Weight: 26,500 kg (58,422 lb)
Wing Area: 95 m² (1023 sq ft)
Engines: 4 x 1030 hp Gnome & Rhône 14N 42/43 (1943)
Maximum Speed: 327 km/h (203 mph)
Range: 5,500 km (3,418 miles)
Practical Ceiling: 6,500 m (21,325 ft)
Crew: 11
Offensive Armament: 4 x 75 kg (165 lb) G2 bombs
Defensive Armament: One dorsal turret with quadruple Darne 7.5 mm machine guns

A fine view of Achernar *at Saint-Mandrier in 1945.*





Latécoère 611 Achernar.



Lioré & Olivier LeO H-242

A Civil Programme

Derived from the twin engine wooden hulled Loire & Olivier H-24 of 1929 and intended for commercial operations in the Mediterranean, the four engined H-242 had a duralumin hull. The Air-Union Airlines ordered two in March 1931. Built in the Argenteuil factory, the prototype made its first flight in March 1933, with factory test pilot Lucien Bourdin at the controls. It was then passed to the CEPA in June, tests being judged as satisfactory. The two aircraft were integrated into the commercial fleet of the newly-formed Air France in August 1933, with the prototype inaugurating the Marseilles-Algiers route in March 1934. Six other aircraft N°s 3 to 8) were ordered in May 1934, followed by four more N°s 9 to 12) in June 1935 and finally, the last two N°s 13 and 14) in June 1936, thus bringing to an end series production of the H-242/1. These twelve additional aircraft were taken on charge by Air France between May 1935 and March 1937, serving Mediterranean routes from Marignane, along with the first two prototypes.

Military Requisition

As from 1936, the Navy Ministry considered requisitioning civil seaplanes in the eventuality of a conflict. Among these were seven LeO H-242s which were considered for allocation to a new Exploration Flight 2E6, later designated 11E and finally, 10E in 1938. This measure was enacted on the declaration of war on 3 September 1939. On that date, 12 LeO H-242s were still available, disposed as follows: N°s 1, 2 and 6 in the Air France workshops at Marignane, N°s 7, 8, 9, 11, 12, 13 and 14 requisitioned at Marignane to wait for conversion to a militarised version, N° 3 at Algiers and N° 4 at Beirut for Air France[1]. However, the Navy decided to put off requisitioning the seven aircraft which had been earmarked, this due to '*the need to avoid interrupting Mediterranean services*' and thus, Flight 10E which had been due to receive them, was not activated.

Nevertheless, on 15 September, SNCASE was awarded a contract for the conversion of these flying boats, but this was not followed through since the seven LeO H-242s remained at the disposition of Air France.

1. Two LeO H-242s were destroyed before the war: N° 10 sank at sea on 8 May 1936 and N° 5 was damaged at Marignane on 9 February 1938.

The prototype LeO H-242 in front of the Argenteuil factory during testing. Note the absence of engine cowlings.

Frontal view of the prototype at Marignane. Note the fine silhouette, despite the relative thickness of the wooden wing.

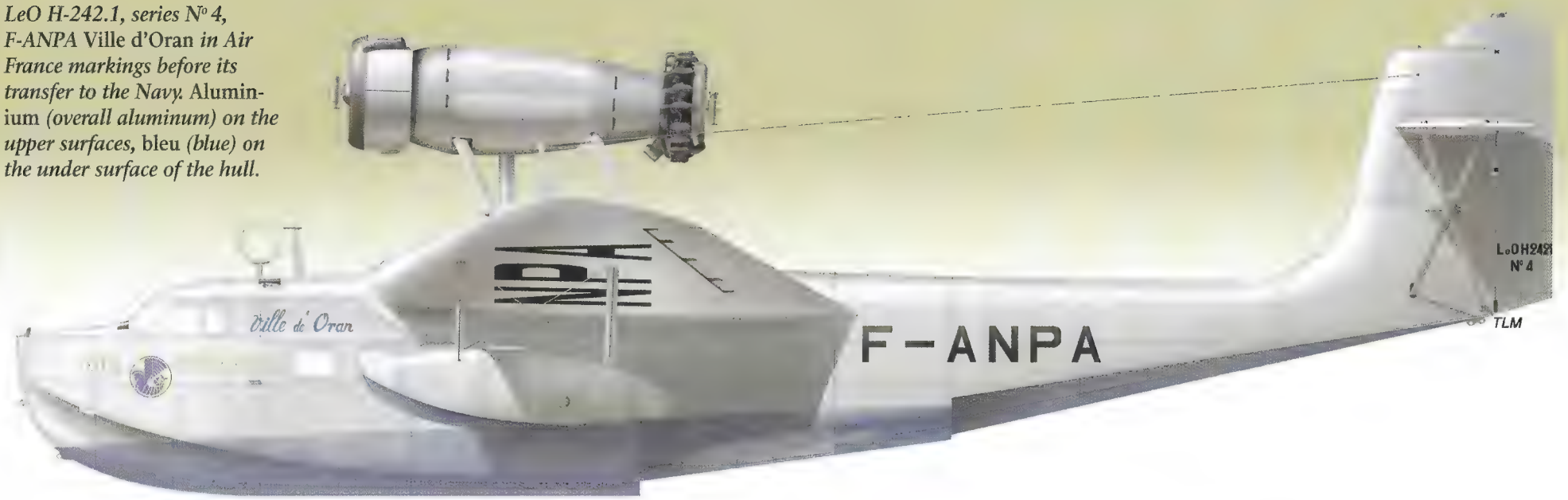
Only N° 4, the *Ville d'Oran*, registered F-ANPA, was requisitioned in the Near East and was taken on by the Navy but it was agreed that it would be given back to Air France in March 1940. This aircraft, blocked at Beirut on 2 September 1939, was placed at the disposal of the Levant Naval Division and allocated to Surveillance Flight 8S2, then being formed at the seaplane base at Tripoli, which was designated as a BAN (*Base d'Aéronautique Navale*) in October 1939. The usual captain of the aircraft, Lanata, was mobilised with the rank of *Lieutenant de Vaisseau*, his crew members, Mechanic Liagre and Radio Operator Raybaud, also serving with him.

The former F-ANPA was mainly employed on open sea reconnaissance missions but these were few, given the lack of military equipment (no armament) and the generally advanced age of the aircraft. In mid-January 1940, a flight was made to Beirut and then another to Alexandria in Egypt.

Two other surveillance missions were carried out off the coast of Cyprus. At the end of January, the aircraft was joined at Tripoli by three Loire 130s, also allocated to 8S4. However, the Leo H-242 quickly became unserviceable as from February 1940 through lack of spare parts and it was struck off charge at Tripoli on 14 May 1940 before being scrapped on site. Its airframe had exceeded 3,000 hours in the air, mostly on civilian flights before the war.

F-APKJ N° 13 Ville de Casablanca *seen here at Marignane. It was destroyed by American P-51s at Jonage on 30 April 1944. Note the engine cowlings fitted on series production aircraft.*

LeO H-242.1, series N° 4, F-ANPA Ville d'Oran *in Air France markings before its transfer to the Navy.* Aluminium *(overall aluminum) on the upper surfaces,* bleu *(blue) on the under surface of the hull.*



Three Air France LeO H-242s at Marignane. F-ANQH N° 11 Ville de Cannes *is on the left, F-ANPD N° 7* Ville d'Ajaccio *in the middle and, on the right, F-ANPA N° 4* Ville d'Oran, *appropriated by the* Aéronautique Navale *at the end of 1939.*

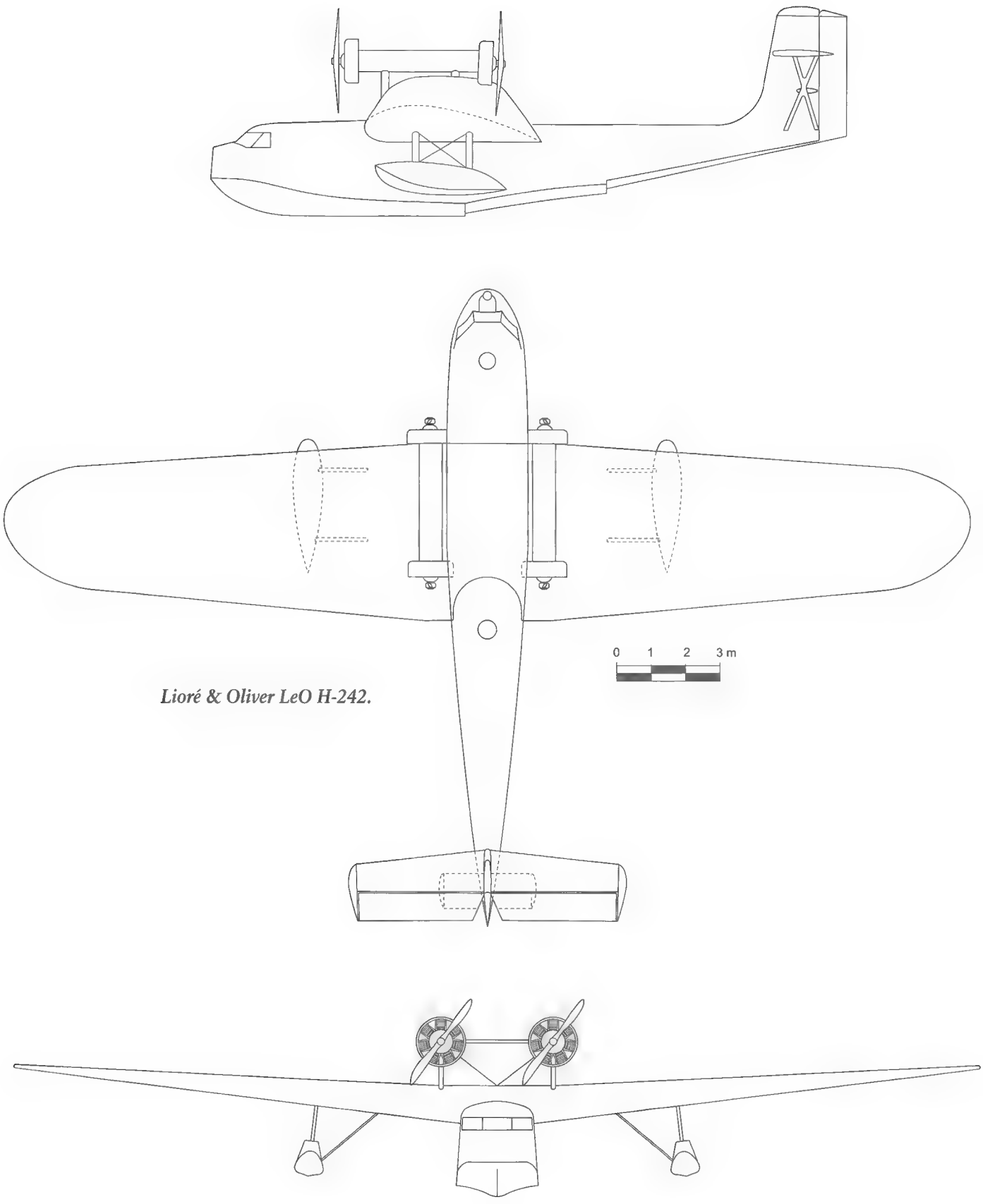
LeO 242 F-ANQH (series N° 11) Ville de Cannes *(1943/44) with civil markings.* Aluminium *on the upper surfaces,* noir *(black) on the under the hull. Yellow wings and tail.*

LeO 242 F-ANQI (series N° 12) Ville de Bizerte *(1943/44) with civil markings.* Aluminium *on the upper surfaces,* noir *(black) on the under the hull. Yellow wings.*

As for the remaining ten Leo H-242s, none of which were allocated to the Navy, four were scrapped due to age in 1940/41 (NMS 2, 3, 6 and 14), two others being heavily damaged during a bombing raid on Marignane on 10 March 1944 and the remaining four were destroyed by American fighters at Jonage near Lyon on 30 April 1944 (N°s 7, 9, 11 and 13).

Air Union and Air France Civilian Contracts
Air Union: March 1931 (Order for N°s 1 and 2)
Air France N° 74 of 09/05/34 (Order for N°s 3 to 8)
Air France N° 91 of 08/06/36 (Order for N°s 9 to 12)
Air France N° 104 of 04/06/36 (Order for N°s 13 and 14)
Manufactured: 14
In *Aéronautique Navale* Service: One N° 4 in series
Unit: 8S4 (1939 – 1940)
LeO H-242 Registrations:
N° 1 (F-AMOU), N° 2 (F-AMUL),
N° 3 (F-ANMP), N° 4 (F-ANPA),
N° 5 (F-ANPB), N° 6 (F-ANPC),
N° 7 (F-ANPD), N° 8 (F-ANPE),
N° 9 (F-ANQF), N° 10 (F-ANQG),
N° 11 (F-ANQH), N° 12 (F-ANQI),
N° 13 (F-APKJ), N° 14 (F-APKK).
General Characteristics:
Four-engine metal hulled monoplane flying boat with floats.
Engines: 4 x 350 hp Gnome & Rhône 7 Kd
Propellers: 4 x Gnome & Rhône series 1490/1500
Length: 18.45 m (60.53 ft)
Span: 28 m (91.86 ft)
Height: 6.33 m (20.77 ft)
Wing Area: 116 m² (1249 sq ft)
Empty Weight: 5,538 kg (12,209 lb)
Laden Weight: 8,450 kg (18,629 lb)
Maximum Speed: 230 km/h (143 mph)
Cruising Speed: 170 km/h (106 mph)
Ceiling: 4,450 m (14,600 ft)
Climb Time to 3,000 m (9842 ft): 18 min
Take-off Time: 18 seconds
Range: 1,300 km (808 miles)
Crew: 3 (military)
Passengers: 12 to 15 (civil)
Defensive Armament: Not fitted
Offensive Armament: Not fitted

Three LeO 242s before the war at Marseille-Marignane station (in foreground F-APKJ N° 13, destroyed by USAAF P-51s at mooring near Lyon in April 1944).



Lioré & Oliver LeO H-242.

F-ANPA N° 4 Ville d'Oran, *in service with Air France, at Algiers before being requisitioned by the Navy.*

F-ANPA, the only LeO H-242 requisition by the Navy, in flight over the Marseilles region.

Lioré & Olivier LeO H-246

A Civilian Programme

In February 1935, the Air Ministry published Technical Programme CT/CPTI calling for a four engine monoplane *'Mediterranean seaplane'*. The Materials Directorate of Air France was looking for a replacement for the LeO H-242s which had entered service in the preceding year on its Mediterranean lines. To speed up the delivery of the new aircraft, it was proposed to build a prototype derived from the 24.2 but with greater capacity, capable of flying at 300 km/h and of carrying 26 passengers (instead of 12) with a range of 1,000 km in still air. Lioré & Olivier instead decided on a new model designated H-246 to replace the last of the four H-242.1s ordered under Air France contract N° 91. In reality, this was to be a fifth aircraft, still designated H-246, which was ordered in December 1935 by a supplementary clause to the preceding contract for a sum of 1,550,000 Francs.

History

The prototype was built at the Lioré & Olivier factory in Argenteuil and delivered disassembled to Marignane. The aircraft, flown by Givon, made its first flight from the Etang de Berre on 29 September 1937, about one year behind schedule. Tests were satisfactory with maximum speed in excess of 320 km/h and take-off time no longer than 20 seconds.

In January 1938, Air France placed an order with the manufacturer for a further six type 246.1s. Unfortunately, during testing by the CEPA in waves one meter high off Saint-Raphaël on 29 April 1938, the bottom of the hull was damaged and a float was partially torn off, but with no injury to the pilots Lecarme and Givon.

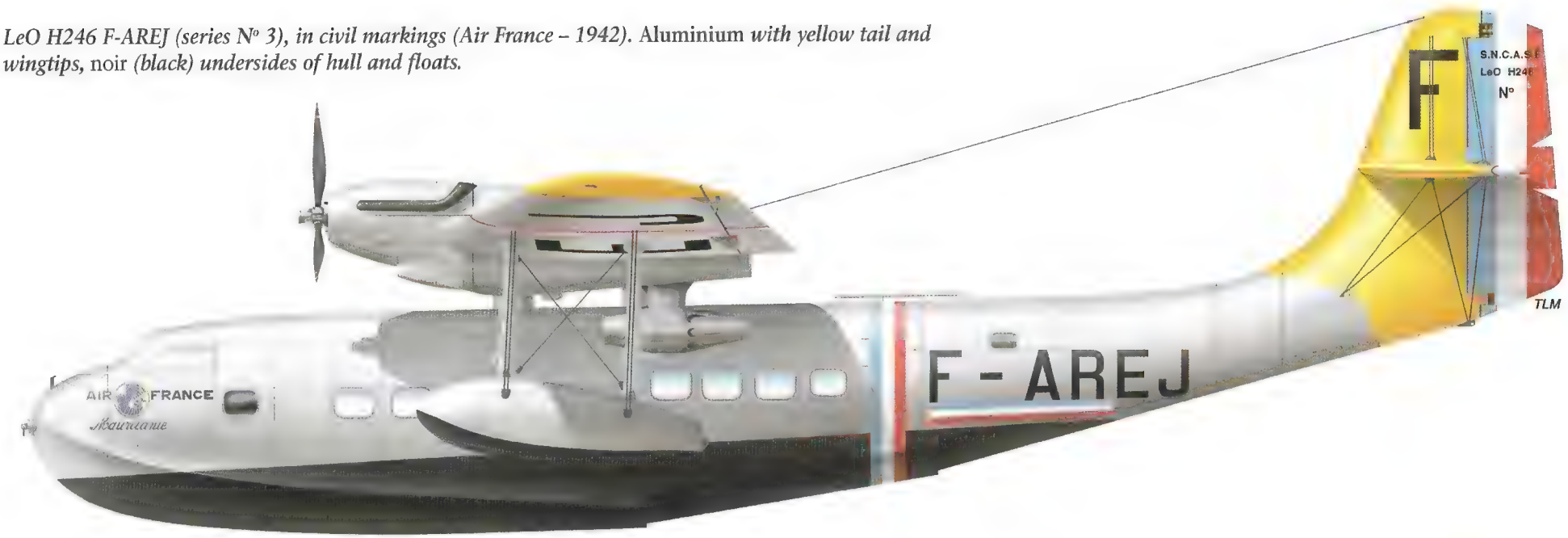
In spite of the structural reinforcements imposed on the LeO H-24.6 following the fatal accident with the LeO H-47 in May 1937, the damage was the same as that incurred on the latter

Rare photo of LeO H-246 N° 4 during conversion for military use at Berre in May-June 1940. Note that it still bears its civil registration F-AREK under the wings but has the Naval anchor on the rudder. (Ricco collection).

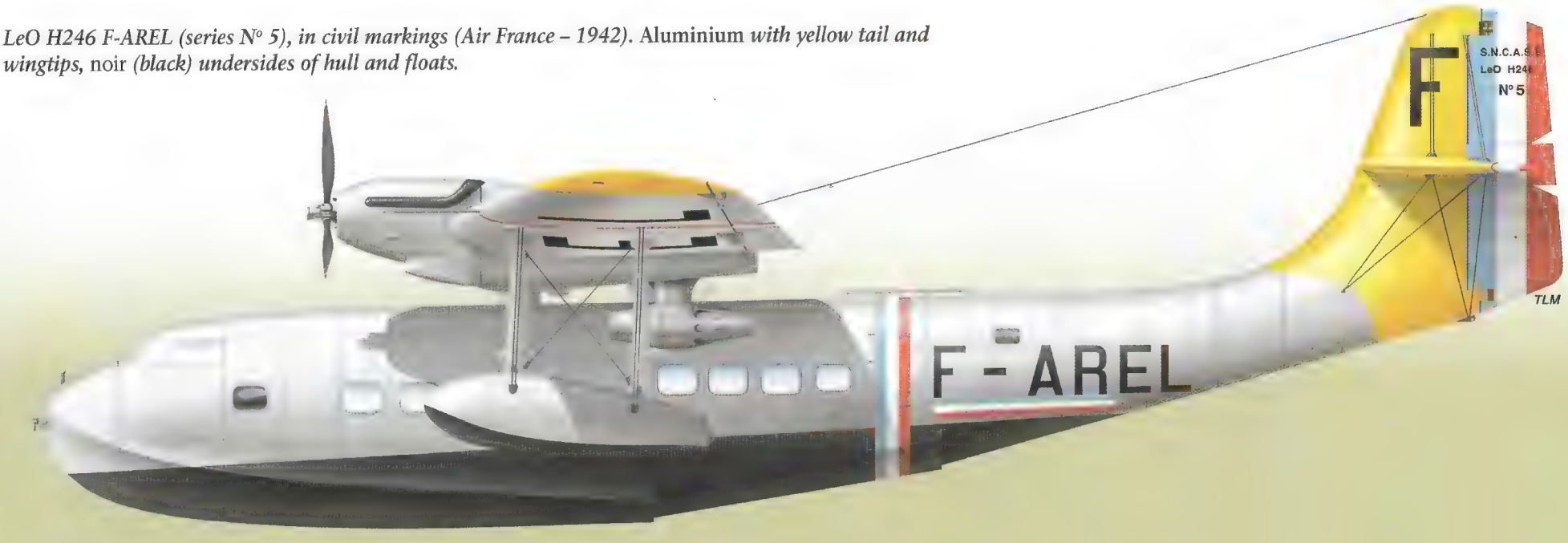
LeO H-246, series N° 4, code 9E-7 (Flight 9E – Berre – 1940). Gris bleu foncé *(grey blue) on the upper surfaces,* gris bleu clair *(light grey blue) on the under surface of the hull. Engine nacelles* noir *(black).*

Leo H246, series N° 4, code 9E7, in Vichy markings – Berre 1942 (requisitionned by Luftwaffe *in 1943).* Gris bleu foncé *(grey blue) on the upper surfaces,* gris bleu clair *(light grey blue) on the under surface of the hull. Engine nacelles (yellow-red)* Vichy markings.

LeO H246 F-AREJ (series N° 3), in civil markings (Air France – 1942). Aluminium *with yellow tail and wingtips,* noir *(black) undersides of hull and floats.*



LeO H246 F-AREL (series N° 5), in civil markings (Air France – 1942). Aluminium *with yellow tail and wingtips,* noir *(black) undersides of hull and floats.*



Militarised LeO H-246 during a stopover at Bizerta-Karouba during one of its postal flights between Hyères and Karouba (July 1940 – Flight 12E).

aircraft a year earlier. Registered F-AOUJ, the prototype made endurance flights between Marignane and Bizerta as from 11 February 1939 in the hands of Air France pilots.

At the same time, manufacture of series production hulls continued at the Vitrolles factory where series production H-470s were also being assembled. The six 246.1s were given series numbers 402 to 407 by SNCASE and were allocated civil registrations F-AREI to F-AREN as well as their given names.

On the outbreak of war, and despite the mobilisation plan for civil aircraft, the prototype F-AOUJ remained at Air France's disposal so that testing could continue.

Nevertheless, on 28 September 1939, the Air Ministry informed SNCASE that the six LeO H-246s under construction should be militarised on behalf of the *Aéronautique Navale*. Outfitting, armament and fuel capacity were to be revised as quickly as possible and the incorporation of a 'glasshouse' similar to that fitted to the militarised LeO H-470s was required.

Finally, a contract for converting four of the six flying boats ordered for 'Exploration' duties was signed in February 1940. The Admiralty envisaged incorporating them *'into Flight 12E during the second quarter of 1940'*. The completion of these aircraft began to experience delays at the

LeO H-246 bearing the complete code '9E-7'.

LeO H-246, series N° 2 (ex-F-AREI) seized by the Luftwaffe *at Marignane in 1943 and bearing the German code 24+61.*

Vitrolles factory to the extent that the first in the series N° 2, registered F-AREI) only made its first flight on 10 April 1940, followed by N°s 3 and 4 shortly before the Armistice.

But only the militarised N° 4 was taken on charge by Exploration Flight E9 at Berre, following its first flight on 21 June 1940 with SNCASE pilot Petit at the controls. Following this, it then passed to Exploration Flight 12E and carried out several mail flights between Hyères and Karouba on a temporary basis before this unit was disbanded.

At the same time, Flight 9E (ex-E9) was not demobilised after the Armistice, contrary to most other *Aéronautique Navale* units, since the German authorities wished the French Admiralty to keep active a number of Flights capable of intervening against '*English attacks coming from the Mediterranean*'. After undergoing a general servicing in August, LeO H-246 N° 4 was taken back into service bearing the code 9E-7. This unit, led by *Commandant* Duval, also included three H-470s and three Breguet *Bizertes*.

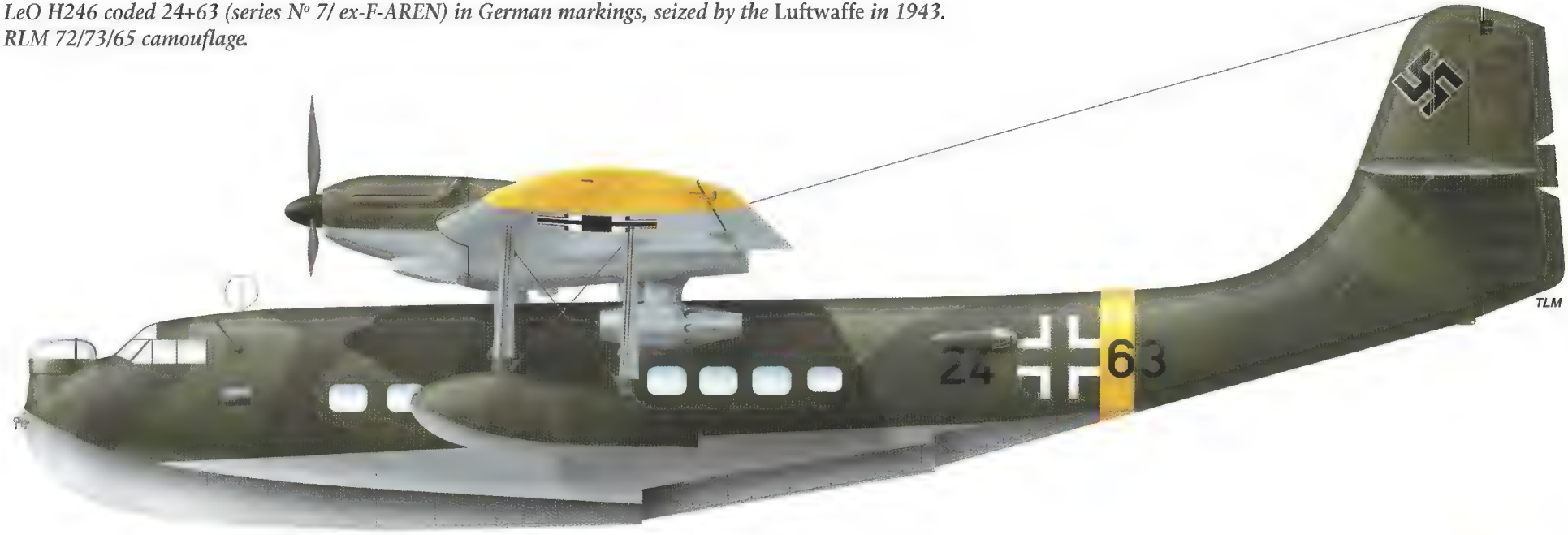
The aircraft resumed flights in February 1941, by which time it had registered barely 120 hours in the air but it was often immobilised during the following months to undergo various modifications. It continued its career with Flight 9E in 1942, making around forty flights, the most notable being the provision of close escort for the cruiser *Dunkerque* on its return from French North Africa on 20 February. In March, the Navy proposed handing the aircraft back to Air France, since there was little further use for it. In June, the German and Italian authorities approved the transfer of the aircraft back to the civilian register but the transaction dragged on and the aircraft did not finally leave the Navy until 21 October 1942, the date of its last flight with 9E.

Militarised H-246 seen at Berre with the prototype Breguet Bizerte *in the background (Summer 1940). Note that only the figure '7' of the code '9E-7' is painted on the hull.*

LeO H246 coded 24+61 (series N° 2/ ex-F-AREI) in German markings, seized by the Luftwaffe *in 1943.* Aluminium *on the upper surfaces,, yellow wingtips and fuselage band,* bleu *(blue) on the under surface of the hull.*

LeO H246 coded 24+62 (series N° 6/ ex-F-AREM) in German markings, seized by the Luftwaffe *in 1943.* Aluminium *on the upper surfaces with yellow wingtips,* noir *(black) on the under surfaces, tail, wings and engine nacelles.*

LeO H246 coded 24+63 (series N° 7/ ex-F-AREN) in German markings, seized by the Luftwaffe *in 1943.*
RLM 72/73/65 camouflage.



LeO H246 coded 24+64 (series N° 1/ F-AOUJ) in German markings, seized by the Luftwaffe *at Marignane in 1943.*
Aluminium *on the upper surfaces with yellow tail and wingtips,* noir *(black) on the under surface of the hull and floats.*

When the Germans took control of the Berre seaplane base on their invasion of the unoccupied zone in November 1942, they seized the aircraft. Its fate from then on is not known, though it appears to have been used by the *Luftwaffe* and, according to rumours, may have served with *KG 200*.

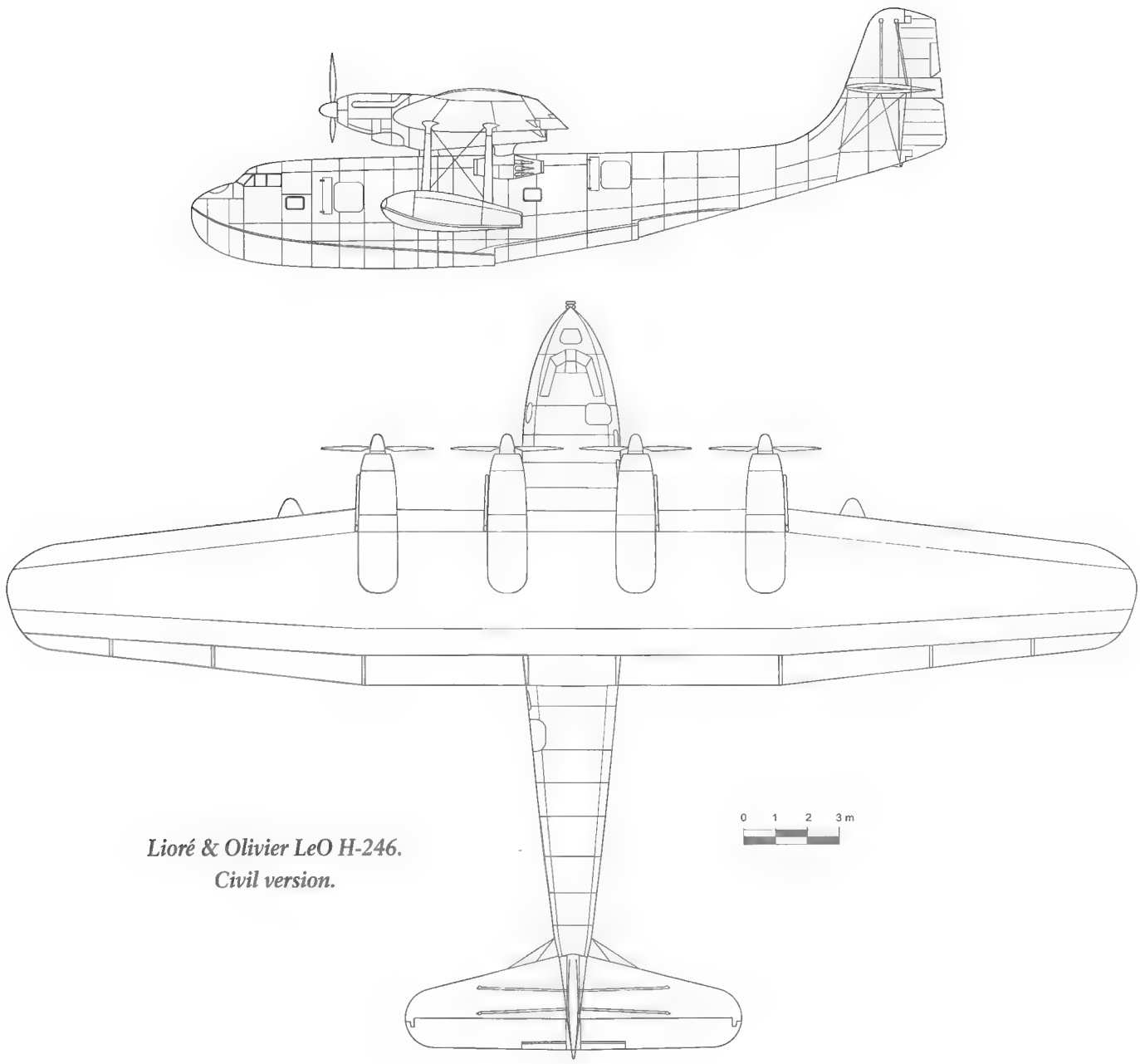
The six remaining LeO H-246s had varying fates. Four of them were requisitioned by the Germans in 1943 and handed over to the *Luftwaffe* (N°s 1, 2, 6 and 7). The last two (N°s 3 and 5) returned to service on Mediterranean routes with Air France until they were scrapped in 1947.

Technical Programme CT/CPTI (Mediterranean Seaplane) of 27/02/35
Additional clause 2 to Air France contract N° 91 of 13/12/35 (order for one LeO H-246)
Contract N° 234/6 of 19/06/36 (order for prototype LeO 246)
Air France contract N° 127 of 31/03/38 (order for six series production LeO H-246.1)
Contract of 10/02/40 (conversion of four H-246.1s for military use)
Manufactured: 7 (one LeO H-246 and six LeO H-246.1)
In *Aéronautique Navale* Service: 1 N° 4 in series)
Units: E9, 12E, 9E (1940 – 1942)

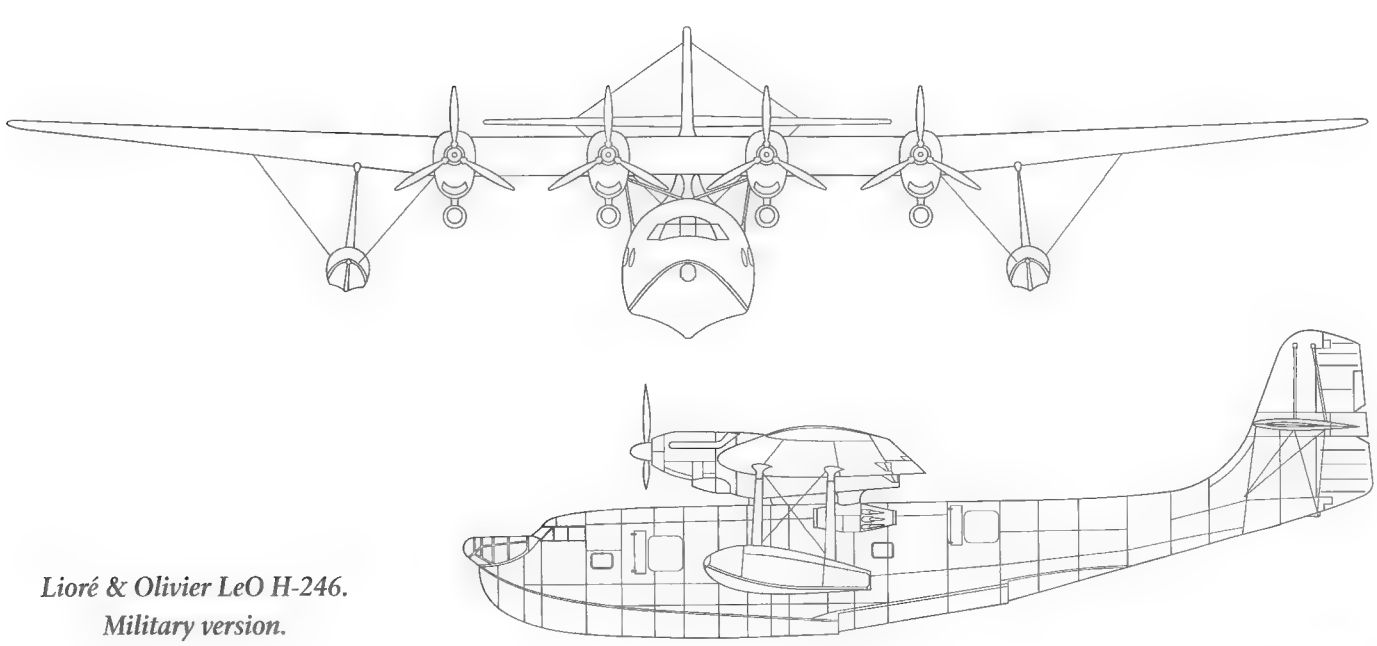
Series N°	Registration	Name	*Aér. Nav.* Code	*Luftwaffe* Code	1st Flight
1	F-AOUJ	*Maroc*	-	24+64	29/09/37 Berre
2	F-AREI	*Sénégal*	-	24+61	10/04/40 Berre
3	F-AREJ	*Mauritanie*	-	-	19/06/40 Berre
4	F-AREK	*Kabylie*	12E-1, 9E-7	(KG 200 ?)	21/06/40 Berre
5	F-AREL	*Oranie*	-	-	19/09/40 Berre
6	F-AREM	*Algérie*	-	24+62	12/11/40 Berre
7	F-AREN	*Tunisie*	-	24+63	23/01/41 Berre

General Characteristics: (Military LeO H.246.1)
Four-engine metal hulled monoplane flying boat with floats
Engines: 4 x 720 hp Hispano-Suiza 12Xrs
Propellers: Three-blade with pitch variable in flight
Span: 31.80 m (104.33 ft)
Length: 21.36 m (70.07 ft)
Height: 7 m (23 ft)
Wing Area: 132 m² (1421 sq ft)
Empty Weight: 10,290 kg (22,685 lb)
Laden Weight: 18,000 kg (39,683 lb)
Cruising Speed: 280 km/h (174 mph)
Maximum Speed: 335 km/h at 2,400 m (208 mph at 7874 ft)
Climb Time to 3,500m (11,483 ft): 15 min
Range: 1,500 km (932 miles)
Crew: 8
Defensive Armament: 4 x 7.5 mm Darne machine guns
Offensive Armament: 4 x 75 kg (165 lb) G2 bombs

LeO-H-246 N° 4 seen here at Karouba in July 1941 (Flight 9E).



Lioré & Olivier LeO H-246.
Civil version.



Lioré & Olivier LeO H-246.
Military version.

Lioré & Olivier LeO H-470

In 1934, Air France issued a technical requirement for a four-engine commercial seaplane capable of operating across the South Atlantic. At the end of 1935, two competing manufacturers emerged victorious from the CEPANA competition: Loire, with the Type 102 and Lioré & Olivier with the H-47.

The Lioré & Olivier design office, led by Chief Engineer Edmont Benoit, favored a flying boat with very aerodynamic lines, having a high cruising speed. The H-47 project drew heavily on experience gained from two of the company's earlier projects: the four-engine LeO H-27 and LeO H-24.2, from which the main elements of hull design and metal construction were drawn.

In August 1935, the Government placed an order valued at 4,929,753 Francs with Lioré & Olivier for a prototype. The hull was to be built at Clichy and the wings at Argenteuil. Lioré & Olivier also possessed a hangar at Antibes at the seaplane base on the Saint-Roch cove and this location was chosen for the start of testing, with the hull arriving by rail at Antibes in May 1936.

The company's test pilot, Lucien Bourdin, took the aircraft up on its maiden flight on the following 25 July. Tests showed the need to lengthen the float struts and to modify the hull step to improve take-off characteristics.

The rectangular engine cooling radiators placed under the wings were also replaced by faired circular models of a new type referred to as 'thermo-propulsive tubes' which increased speed by several km/h as well as improving engine cooling. Air France was satisfied with the test results and placed an order with SNCASE (ex-Lioré & Olivier) for five series aircraft, now designated H-470, for a total amount of 27,750,000 Francs.

Unfortunately, on 10 May 1937, when testing was virtually completed, the prototype H-47, now named *Atlantique 1*, suffered a hull failure during take-off from Antibes and it sank, leading to the loss of five crew members, including the pilot Bourdin, though the remaining five escaped miraculously. In spite of this terrible accident, the order for five series production H-470s was

Series assembly line of the LeO H-470 at the SNCASE factory at Vitrolles (Berre lake) in 1938. In front, on the left, is N° 1, registered F-AQOA, requisition by the Navy in 1939 and allocated the code E11-1 and the name La Sorcière.

LeO H-470 N° 2 (ex-F-AQOB) coded E11-2 lying damaged on Lake Urbino (Corsica) on 10 December 1939. It was scrapped afterwards.

LeO H470 (series N° 2/ coded E11.2/ex-F-AQOB) of Exploration Flight E11 (Berre 1939). Destroyed by accident on 10/12/1939. Gris bleu clair *(light grey blue) on the upper surfaces,* bleu *(blue) on the under surface of the hull and floats.*

E11-5, series N° 5, at the Hourtiquets base, Biscarrosse, in April 1940. This aircraft was shot down by Italian fighters in August 1940 while on a postal flight between Hyères and Karouba.

maintained and an assembly line was set up at Vitrolles in a hanger belonging to SNCASE on the banks of the Etang de Berre. The five aircraft, registered from F-AQOA to AQOE, made their first flights between July 1938 and June 1939, flown by test pilots Givon, Petit and Lecarme.

The aircraft were on the point of being delivered to Air France when war was declared. On 3 September 1939, they were requisitioned on behalf of the *Aéronautique Navale* which was greatly in need of them. They were then allocated to Flight 11E, based at Berre, which had been created especially for them[1].

They were then converted for military use for 'Exploration' purposes by fitting bomb racks, lateral gun hatches and a nose 'glass house'.

But on 10 December 1939, the Flight suffered its first loss. N° 2 (E11-2) was heavily damaged on Urbino Lake in Corsica, fortunately without loss of life, when it somersaulted on touch-down after a training flight. In January 1940, the four aircraft available were transferred to the Naval Air Base (BAN) at Hourtiquets (Biscarrosse) to protect convoys moving along the Spanish and Portuguese coasts towards the Bay of Biscay.

No submarines were detected but one mission remained in the air for 15 hours. After this assignment, the aircraft were moved to Bizerta-Karouba at the end of the month.

The Italian declaration of war broke the monotony of patrol flights.

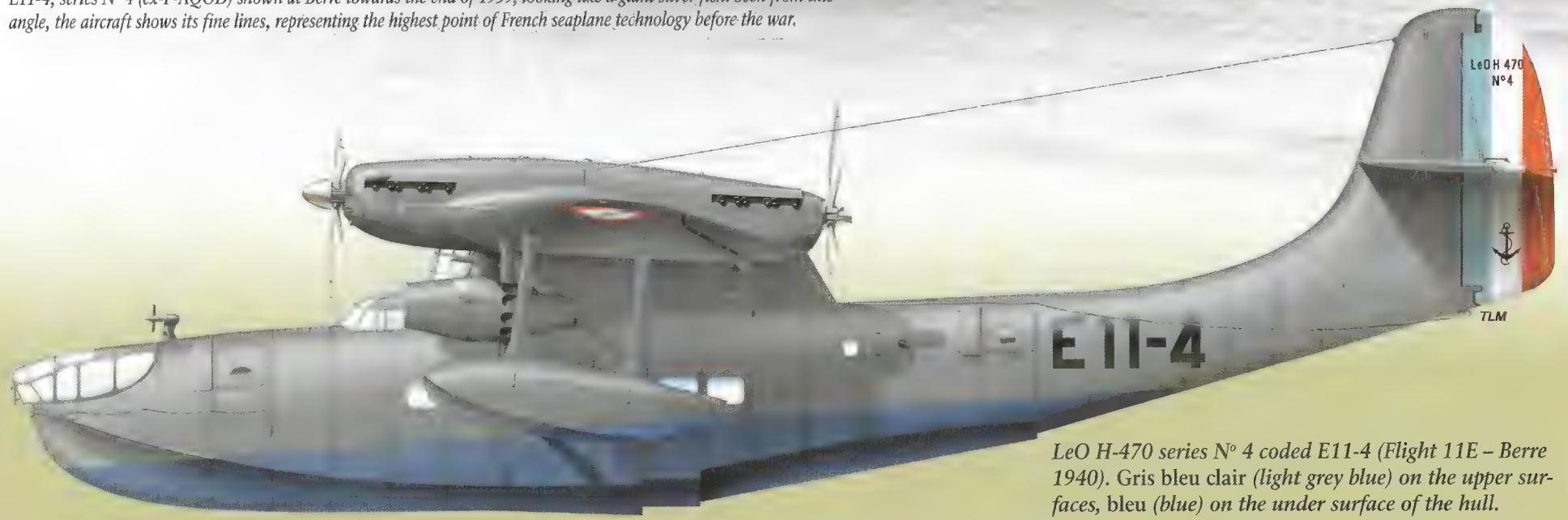
On 22 June, 11E-1 surprised an Italian submarine on the surface with a CANT Z.506 seaplane hydroplaning alongside it. Two bombs were dropped on the submarine without noticeable effect while the two aircraft exchanged bursts of machine-gun fire, again without result.

On 23 June, off the coast of Sardinia, 11E-3 spotted a dozen warships engaged in moving the 7th Italian Division to Cagliari. The aircraft was fired on by the Italian ships but was undamaged.

At around 18:00 on 24 June, while 11E-2 was on its way to Karouba, it was attacked off the Sardinian coast by an Italian CANT Z 506 seaplane of 199e *Squadriglia* based at Cagliari-Elmas.

1. Surprisingly, the Flight – 11E – should have been designated the other way round, as E11, which was the logical sequence followed by other Exploration Flights at the beginning of the war, going from E1 to E8, since E9 and 10E were not formed until October and November 1939. In another anomaly, the unit's five LeO H-470s received codes E11-1 to E11-5 painted on the hull and not 11E-1 to 11E-5.

E11-4, series N° 4 (ex-F-AQOD) shown at Berre towards the end of 1939, looking like a giant silver fish. Seen from this angle, the aircraft shows its fine lines, representing the highest point of French seaplane technology before the war.



LeO H-470 series N° 4 coded E11-4 (Flight 11E – Berre 1940). Gris bleu clair *(light grey blue) on the upper surfaces,* bleu *(blue) on the under surface of the hull.*

Neither aircraft was damaged during the ensuing fire fight[2]. At the end of June, the German Armistice Commission authorized the French Admiralty to use Flight 11E for mail flights between French North Africa and mainland France. During one of these de-militarized flights between Karouba and Hyères on 9 August 1940, 11E-2 N° 5, under the command of *E.V.* Le Saint, was shot down by mistake by two Italian FIAT CR. 42 fighters. Two of the thirteen people on board the French aircraft were killed and two more seriously injured while the dog *Mirette*, mascot of AC3 fighter squadron, also lost her life 'on the battlefield'. By September 1940, Flight 11E had been disbanded and the remaining three LeO H-470s joined Flight 9E based at Berre along with three Breguet *Bizertes* and one LeO-246.

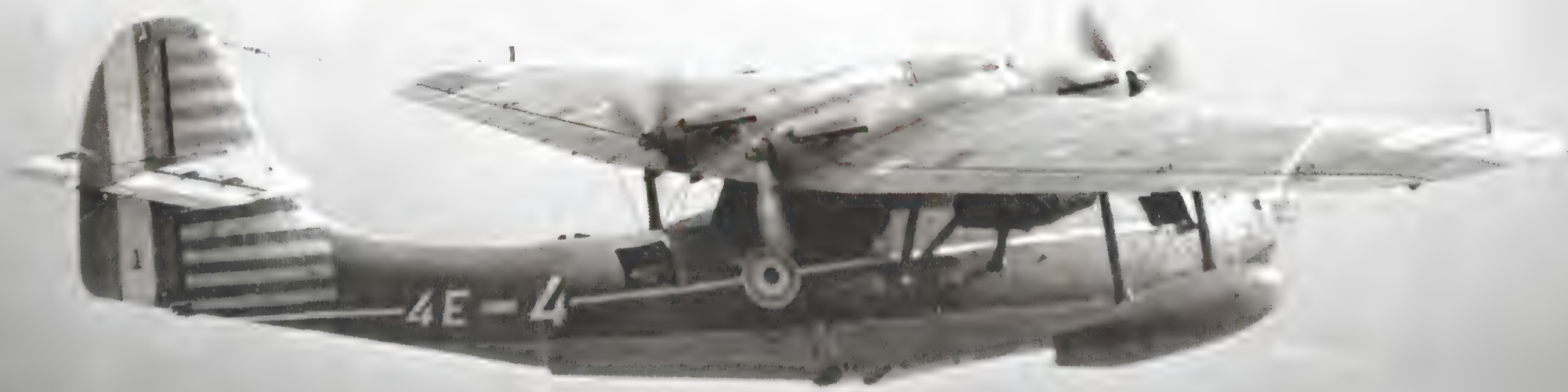
During this period, a successful test was made with H-470 N° 3 which took off using a Jaëger-Smith automatic pilot, a world first on a seaplane. In June 1941, the three aircraft were transferred to Flight 4E at Dakar, where they were used by the *Aéronautique Navale* in French West Africa which was short of resources to counteract British incursions in the area. By this time, the LeO H-470s were suffering from intensive use and on several occasions, wing fabric became detached in flight. In 1942, one of the aircraft was used in an exercise to fly 1,500 litres of fuel to four LATE 298 seaplanes of Flight 6T on Retba lake; this transfer was made in 1h 30m using Japy hand pumps.

On 26 January 1943, 4E-5 N° 1 was damaged beyond repair during a night take-off at Port-Etienne. It was decided to use it as a source of spare parts for the remaining two H-470s but the days of these aircraft were drawing to a close, since they had now accumulated over 500 flying hours since their entry into service and this in operational and climatic conditions which took a heavy toll on their airframes. On 18 July 1943, N° 4 made the final flight of a LeO H-470 with Flight 4E and it was withdrawn from service in August along with N° 3. Left abandoned on the water at Bel-Air, it sank after being hit by an American barge. The last aircraft of the type was scrapped in January 1944, bringing to an end the eventful military career of this *'Transatlantic racer'* as Air France proudly named it before the war.

2. Incidentally, this combat between a LeO H-470 and a CANT Z 506 is considered to have been the last between an aircraft of the *Aéronautique Navale* and an enemy aircraft before the Armistice came into effect at 00:35 on 25 June 1940.

E11-1, series N° 1, La Sorcière *photographed at Karouba before the Armistice.*

LeO H470 (series N° 4), codes 4E.4 (Dakar 1942) with Vichy markings. Gris bleu clair *(light grey blue) on the upper surfaces,* bleu *(blue) on the under surface of the hull and floats. On tail and front of engine nacelles (yellow-red) Vichy markings.*



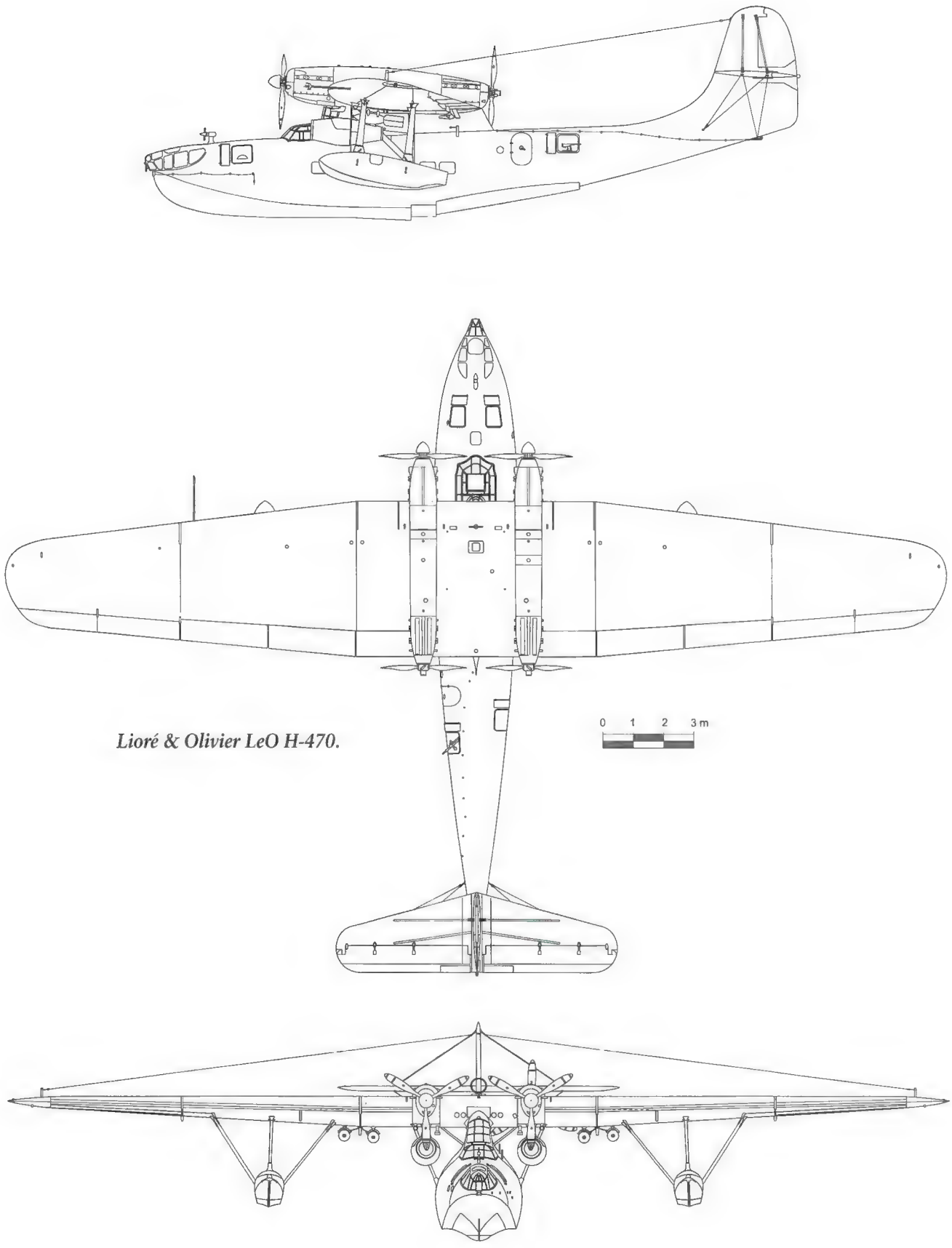
4E-4, series N° 4 (ex-F-AQOE) attached to Flight 4E at Dakar. It is shown in flight in 1942 bearing Vichy markings.

Air Ministry and Air France Contracts
Contract N° 849/5 of 10/08/1935 (order for a prototype H-47)
Air France contract N° 118 of 01/03/37 (order for five H-470)
Manufactured: six (one H-47 and five H-470)
In *Aéronautique Navale* Service: five (H-470)
Units: 11E, 9E 4E.

Type	Registration	*Aér. Nav.* Code	Name	First flight
H-47 N° 01	F-APPR	none	*Atlantique I*	25/07/36
H-470 N° 1	F-AQOA	E11-1, 9E-1, 4E-5	*La Sorcière*	23/07/38
H-470 N° 2	F-AQOB	E11-2	*La Sylphide*	16/11/38
H-470 N° 3	F-AQOC	E11-3, 9E-2, 4E-6	*La Sérieuse*	17/02/39
H-470 N° 4	F-AQOD	E11-4, 9E-3, 4E-7, 4E-4	-	22/03/39
H-470 N° 5	F-AQOE	E11-5, E11-2	-	20/06/39

General Characteristics:
Four engine metal hulled monoplane flying boat with floats
Engines: 4 x 880 hp Hispano-Suiza 12Y34/35
Propellers: Ratier
Length: 21.57 m (70.76 ft)
Span: 31.80 m (104.33 ft)
Height: 7.15 m (23.45 ft)
Wing Area: 135 m² (1453 sq ft)
Empty Weight: 10,270 kg (22,641 lb)
Laden Weight: 20,500 kg (45,195 lb)
Ceiling: 7,000 m (22,966 ft)
Climb Time to 4,000 m (13,123 ft): 19 min 50 sec
Range: 4,445 km (2762 miles)
Take-off Time: 40 sec (20,000 kg) (44,092 lb)
Crew: Nine
Defensive Armament: 4 x 7.5 mm Darne machine guns
Offensive Armament: 4 x 75 kg (165 lb) G2 bombs

LeO 470 (series N° 5), codes 11E.2, shot down in August 1940, seen at Bizerte-Karouba Navy Station in July 1940.



Lioré & Olivier LeO H-470.

Loire 70

Origin of Technical Programme

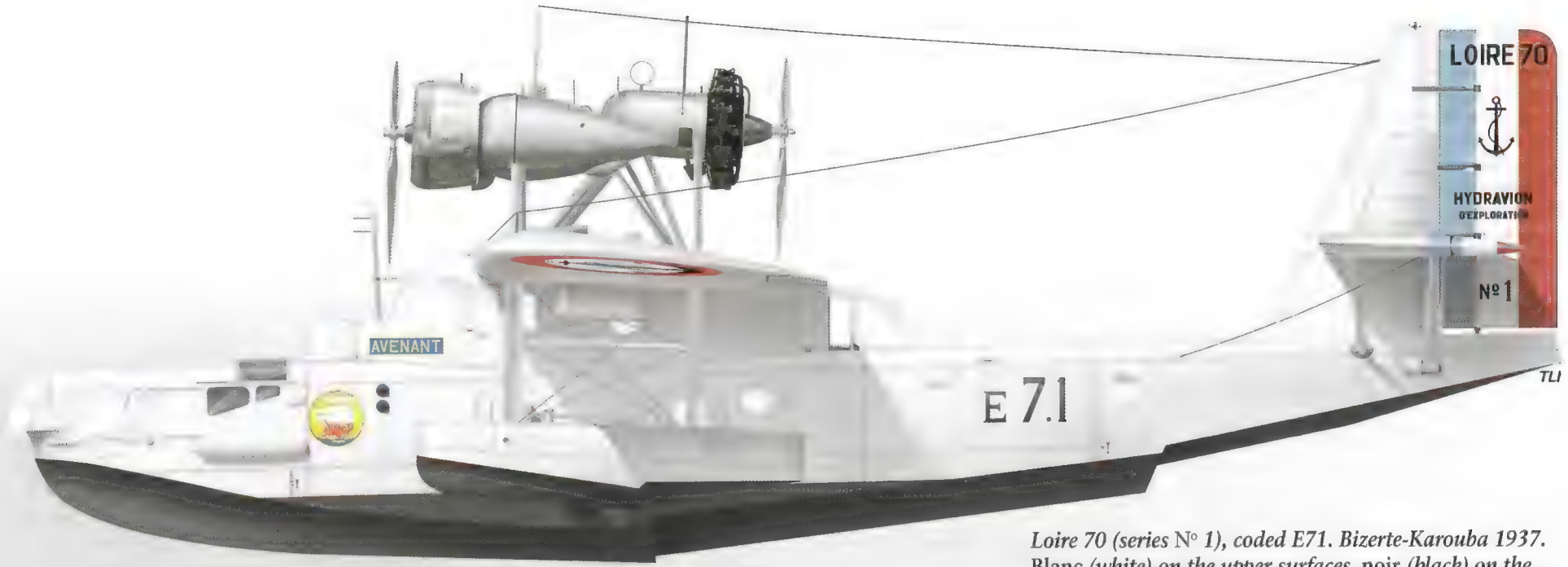
The Loire 70 was developed in response to the same 1931 technical programme as the Breguet *Bizerte* and the Latécoère 580 (Class E Exploration seaplane). The main objective was to develop a replacement for the CAMS 55, Latham 43 or 47 and the Breguet-Short *Calcutta*. In broad terms, the aircraft had to be multi-engine, have a long range and excellent seaworthiness so that it would be able to effectively patrol off the coasts of France and its colonies.

History

The Loire 70 was developed by the *Société des Ateliers et Chantiers de la Loire* at Saint Nazaire under the direction of the engineer Yves Jan-Kerguistel. It evolved from the same firm's types 50 and 60, adopting the classic formula of a '*flying boat with engines mounted high above the central part of the wing*'. An initial contract for a mock-up was signed with the manufacturer at the end of 1931. The aircraft had a feature unique among French military seaplanes in that it had two distinct cockpits at different levels for the pilot, the claimed advantage being to '*make it easier to manoeuvre*

The prototype Loire 70, photographed from the lifting crane at the Loire factory at Saint-Nazaire during testing. Note the front of the hull, differing from the series version.

The prototype undergoing tests at the CEPA, Fréjus-Saint-Raphaël. Note the ground handling undercarriage.



Loire 70 (series N° 1), coded E71. Bizerte-Karouba 1937. Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces. Engine nacelles* Aluminium *(aluminum).*

The prototype Loire 70 l'Avenant, *code E7.1 with modified nose, flying with Flight E7.*

Loire 70 (series Nº 2) bearing the same code (E71) as Nº 1. Bizerte-Karouba 1937. Blanc *(white) on the upper surfaces,* noir *(black) on the under underside of the hull. Engine nacelles* Aluminium *(aluminum).*

Nº 2 l'Aventureux *which for a time carried the same code as the prototype (E7.1).*

on the water' according to its designers. Incidentally, the Loire 70 was also the first monoplane flying boat to enter service with the *Aéronautique Navale*.

The prototype made its first flight from Saint-Nazaire, crewed by Yves Jan-Kerguistel and the factory pilot Pierre Nadot, on 28 December 1933, three months after that of its direct competitor, the Breguet *Bizerte*. The flight programme continued without incident until January 1934 when the hull was damaged in an encounter with an unmarked rock, the aircraft being out of service for three weeks as a result.

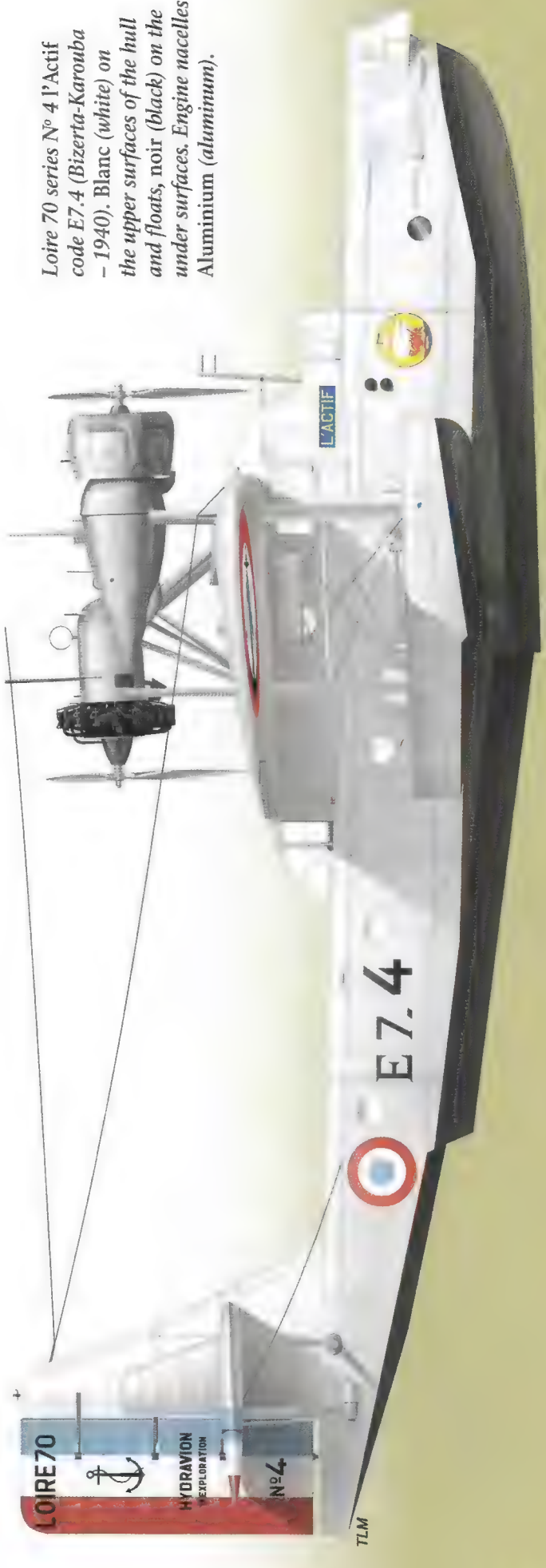
The Loire company was able to draw some commercial advantage from this accident, modifying the double bottom of the aircraft's hull, thus limiting damage which might arise from such incidents.

In March, the authorities notified the manufacture of a retroactive contract regularising the supply of the prototype, this being done after its first flight; this had also been the case for the prototype of the Breguet *Bizerte*. The Loire 70 was transferred to Saint-Raphaël on 22 June 1934, where it soon began its official CEPA test programme.

The performance of the aircraft turned out to be better than that required by the specification but still not up to that of the Breguet *Bizerte*, which benefited from the advantage of its supercharged Gnome & Rhône K14 engines, compared with the Loire 70's 9 Krd which were not supercharged, the extra power giving the Breguet aircraft an advantage in terms of take-off and ceiling. Even before the end of testing, the Loire 70's fate had already been sealed since, by the end of 1934, Breguet had already been awarded two contracts for a total of 14 *Bizertes*, whereas barely half that number of series type 70 had been ordered from Loire. The prototype returned to Saint-Nazare in January 1935 to undergo a long series of modifications, the main ones being to firing positions, which were now to be enclosed, as on the Breguet *Bizerte*.

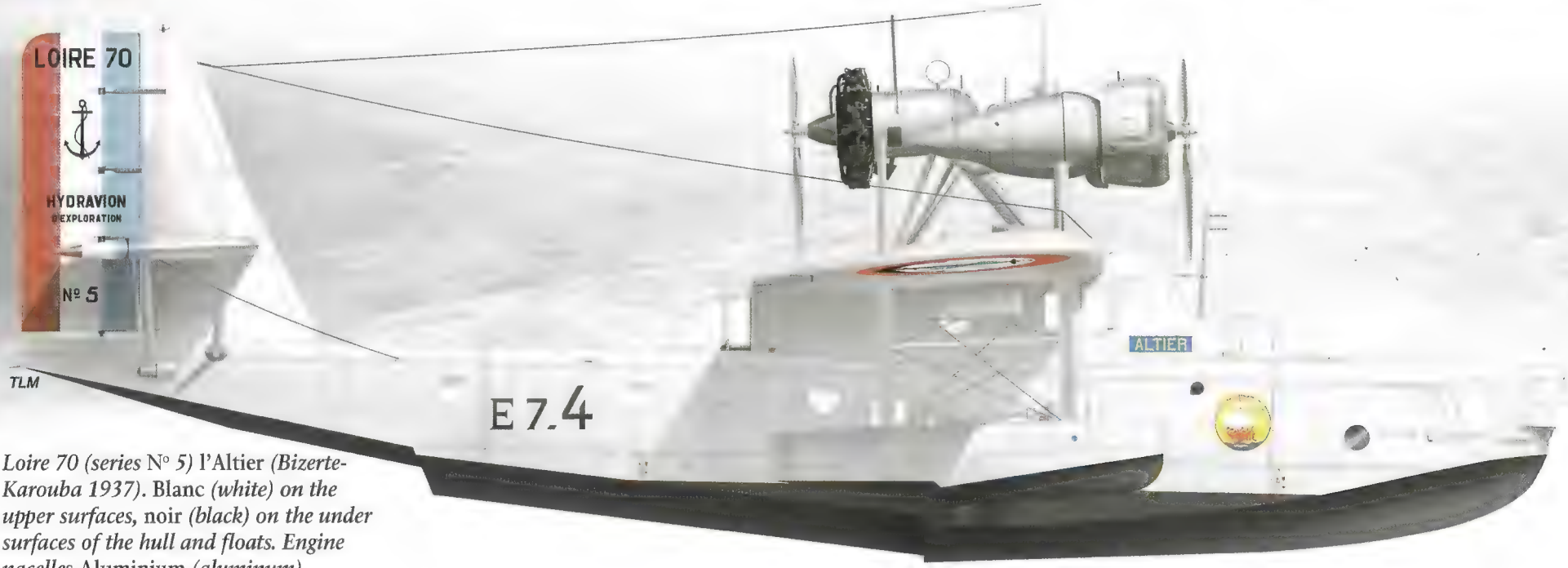
More powerful 9 Kfr engines were also fitted. In June, the Loire 70 returned to Saint-Raphaël for a final series of tests. During this period, it made an 'endurance cruise' in the Mediterranean in April 1936, this being marked by an engine failure leading to a forced stopover at Gibraltar. As a result of the nationalisations which took place in 1936, the series of seven Loire 70s was now to be manufactured by the *Société Nationale de Constructions Aéronautiques du Sud Ouest* (S.N.C.A.S.O.), which had taken over the order book of the Loire company.

Loire 70 N° 2 made its maiden flight with Pierre Nadot at the controls on 24 March 1937. After a short period of testing at the CEPA in May, it went to Flight E7 (ex-4E) at Bizerta-Karouba (Tunisia) on 1 July, one year later than



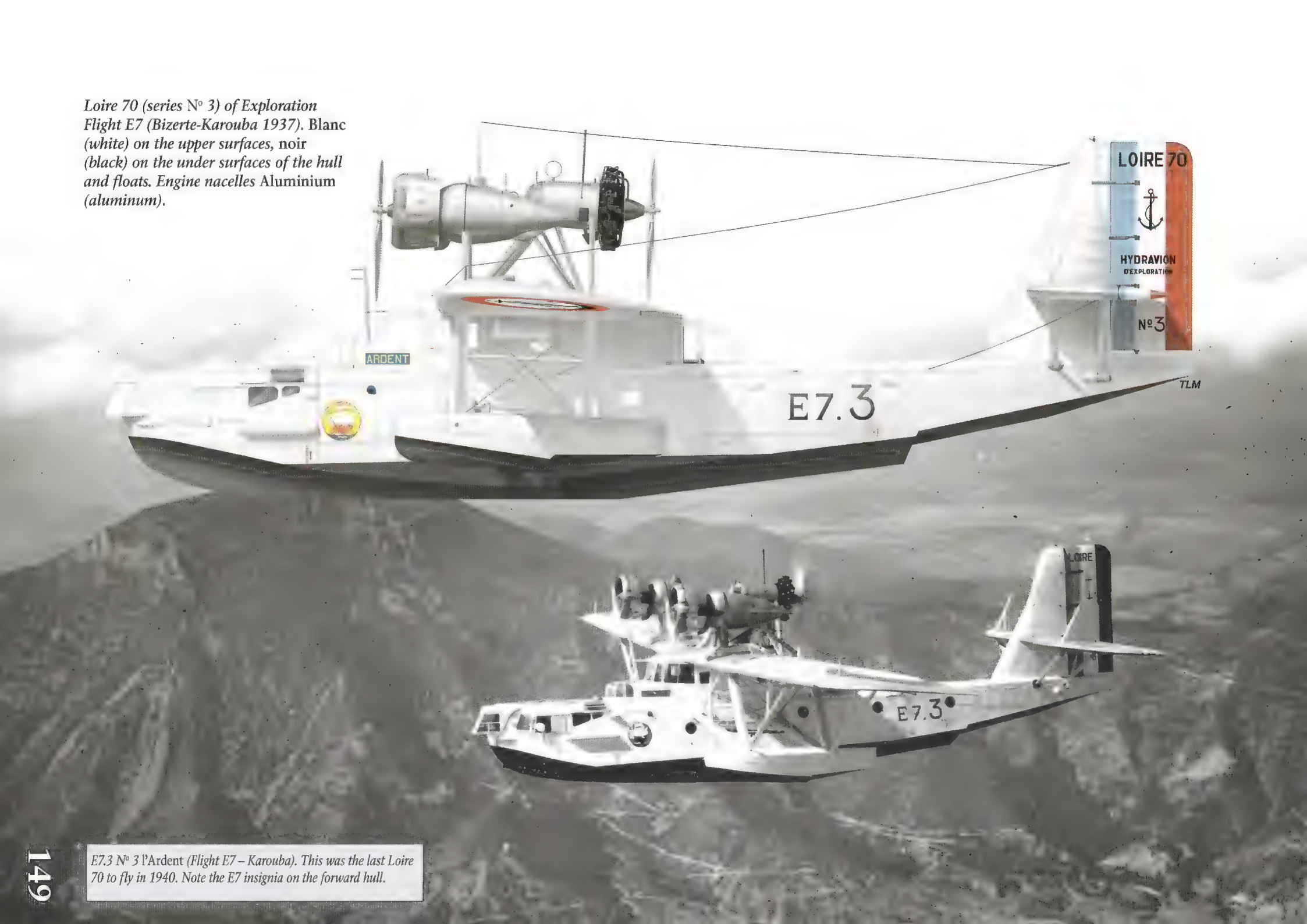
Loire 70 series N° 4 l'Actif code E7.4 (Bizerta-Karouba – 1940). Blanc *(white) on the upper surfaces of the hull and floats,* noir *(black) on the under surfaces. Engine nacelles* Aluminium *(aluminum).*

E7.4 N° 5 attached to Flight E7 at Karouba.

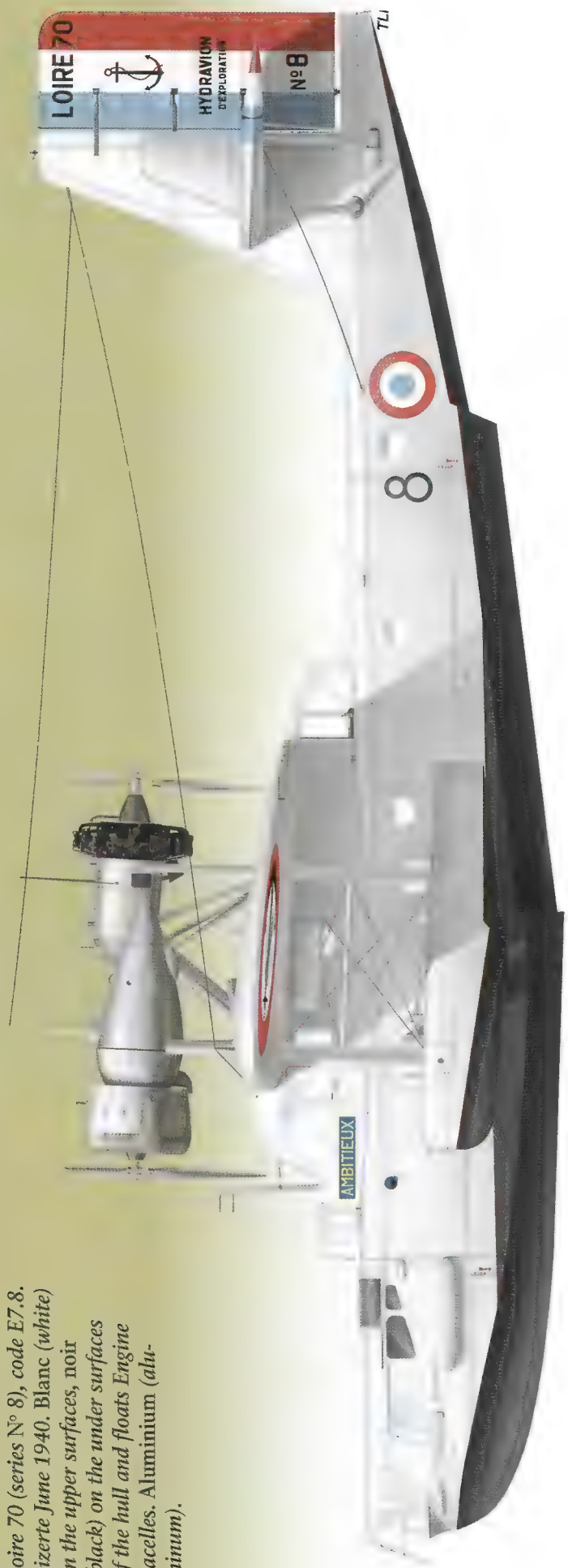


Loire 70 (series N° 5) l'Altier *(Bizerte-Karouba 1937).* Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces of the hull and floats. Engine nacelles* Aluminium *(aluminum).*

Loire 70 (series N° 3) of Exploration Flight E7 (Bizerte-Karouba 1937). Blanc *(white) on the upper surfaces,* noir *(black) on the under surfaces of the hull and floats. Engine nacelles* Aluminium *(aluminum).*



E7.3 N° 3 l'Ardent *(Flight E7 – Karouba). This was the last Loire 70 to fly in 1940. Note the E7 insignia on the forward hull.*



Loire 70 (series N° 8), code E7.8. Bizerte June 1940. Blanc (white) on the upper surfaces, noir (black) on the under surfaces of the hull and floats Engine nacelles. Aluminium (aluminum).

the original programme. This Flight, commanded by C.C. Lamy, was the only *Aéronautique Navale* unit to receive the eight Loire 70s manufactured, these being to replace the unit's obsolete CAMS 55s.

But very soon, the first three Loire 70s to be put into service with E7 were forbidden to fly after the discovery of serious cracks in the mountings of the engine support pylons, this being caused by engine vibrations, becoming a recurrent problem on this type.

Flights of those aircraft in service were again suspended in October 1937 since some engine mounting components had been made of forged aluminium instead of in steel, as specified in the contract. In unit service, naval crews were far from happy with the Loire 70 on account of its general fragility and limits on its use, with maximum take-off weight being limited to 10.5 tonnes.

N° 8, the last in the series and the first to be fitted with a Jaeger-Smith automatic pilot, made its first flight at Saint-Nazaire on 28 March 1938. It was delivered to E7 at Bizerta-Karouba on 15 June. This unit had now reached its strength of eight Loire 70s and was now fully operational on the type, almost two years behind on the Admiralty's original programme. In September 1938, one of the aircraft was seriously damaged when it rebounded on take-off, removing about two metres of skinning from the bottom of the hull, fortunately without loss to the crew. But, on return from a nocturnal exercise on 16 May 1939, E7-6 N.6, with nine crew on board, hit the surface of the lake at Bizerta at a high speed in excess of 230 km/h. This was the *Aéronautique Navale*'s most tragic pre-war accident, six of the crew being killed, including the Flight's commander, *L.V.* Flamand.

At the beginning of the war on 3 September 1939, E7 had six Loire 70s under the command of *L.V.* Lacoste and was still based at Karouba. Its missions entailed coastal patrols out of Bizerta and up to the west coast of Sardinia on convoy protection and on the look-out for submarines. The only occasion on which arms were used by a Loire 70 during hostilities was on 22 November 1939, when E7-7 fired a machine gun burst across the bow of a Greek freighter to force it to divert to Tunis.

Weaknesses in the engine supports and the hull of Loire 70s considerably restricted the unit's operations[1]. On average, one mission out of four was cut short due to engine failure. By comparison, the Loire 70 was unable to match the Breguet *Bizerte* in operational service, the latter being noted for the solidity of its hull and the reliability of its engines.

1. In September 1939, the unit's commander, L.V. Lacoste ordered crews 'never to touch down with more than 2,000 litres of fuel on board' to avoid damage to the hull by overloading.

As if these failings were not enough, enemy action finally brought to an end the calamitous history of the Loire 70 in *Aéronautique Navale* service. On 12 June 1940, some 20 Italian S.M.79 bombers of 32nd *Stormo* based in Sardinia raided the Bizerta area, with about 20 bombs falling on the base at Karouba. At the time, five of the Loire 70s had been hauled up onto land and the sixth was at its moorings (N°s 1, 2, 3, 4, 7 and 8). When the attackers had departed, the result proved to be a disaster for Flight E7, only one Loire 70 having survived the Italian bombing raid.

In spite of 153 sorties, of which 76 were war missions, between September 1939 and June 1940, the Loire 70s had scarcely any opportunity to prove their worth against the enemy, not even to drop a single bomb on a submarine. On 27 July 1940, E7-3 N° 3 made a final flight to test its engines and was then put into storage at Karouba. On 1 August, Flight E7, by then re-designated 7E, was disbanded. The only surviving Loire 70 (N° 3) was scrapped at Karouba in October 1941. At the same time, its initial competitor, the Breguet *Bizerte*, nevertheless continued flying with the French navy and the *Luftwaffe*.

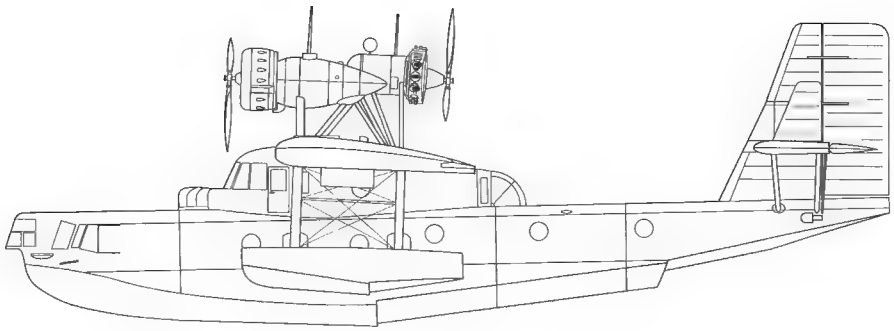
Air Ministry Contracts and Naval Order
N° 385/1 of 17/11/31 (Order for mock-up)
N° 218/3 of 29/03/34 (Order for prototype N° 1)
N° 77 EMG AERO/M of 29/12/34 (Order for seven Loire 70s)
N° 892/5 of 16/09/35 (Order for seven Loire 70s N°s 2, 3, 4, 5, 6, 7 and 8)
Manufactured: eight
In Aéronautique Navale Service: eight
Units: (1937 – 1940): E7/7E *Escadre Volante de la Méditerranée*
Given names:
N° 1: *l'Avenant* (code E7-1), 1st flight: 28/12/33 Saint-Nazaire
N° 2: *l'Aventureux* (code E7-1, E7-2), 1st flight: 24/03/37 Saint-Nazaire
N° 3: *l'Ardent* (code E7-2, E7-3), 1st flight: 26/05/37 Saint-Nazaire
N° 4: *l'Actif* (code E7-5, E7-4), 1st flight: 11/06/37 Saint-Nazaire
N° 5: *l'Altier* (code E7-4, E7-5), 1st flight: 14/08/37 Saint-Nazaire
N° 6: *l'Alerte* (code E7-3, E7-6), 1st flight: 15/12/37 Saint-Nazaire
N° 7: *l'Agile* (code E7-6, E7-7), 1st flight: 24/01/38 Saint-Nazaire
N° 8: *l'Ambitieux* (code E7-7, E7-8), 1st flight: 28/03/38 Saint-Nazaire

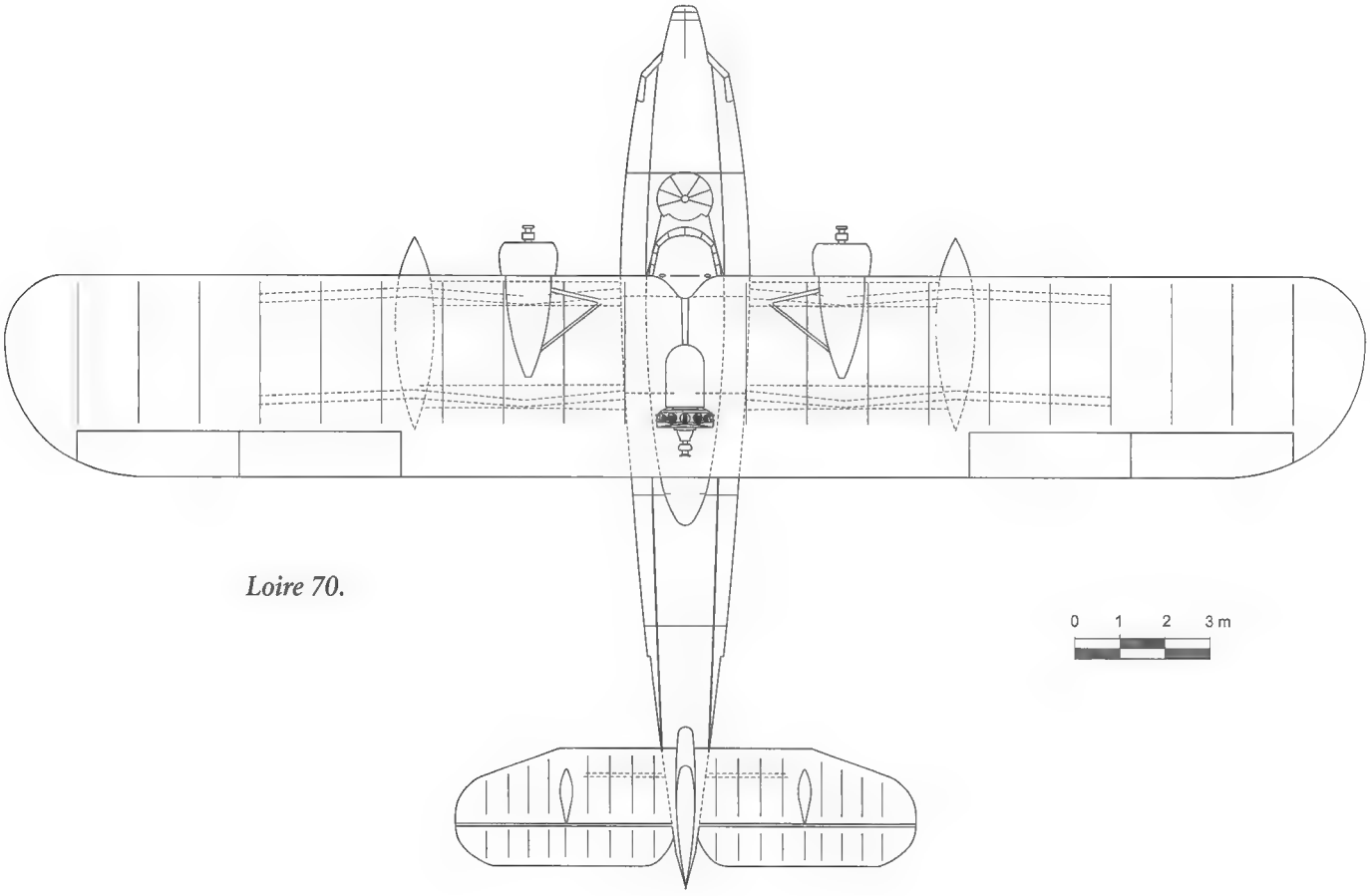
Loire 70 (series N° 8), codes E7.8, in flight over Karouba navy station, before the war.

Loire 70, codes E7.4 (series N° 4) over the Bizerte area before the war.

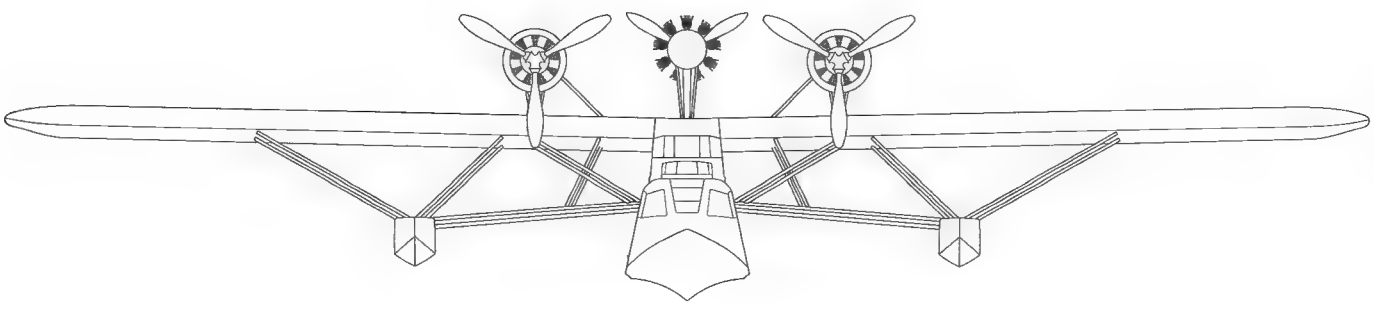
General Characteristics: (series Loire 70 S)
Three-engine metal hulled flying boat with floats
Engines: 3 x 740 hp Gnome & Rhône 9 Kfr Mistral
Propellers: Three-blade Ratier (1394 – tractor, 1395 – pusher)
Length: 19.58 m (64.23 ft)
Span: 30 m (98.42 ft)
Height: 6.78 m (22.24 ft)
Wing Area: 136 m² (1464 sq ft)
Empty Weight: 8,600 kg (18,960 lb)
Laden Weight: 12,000 kg (26,455 lb)
Maximum Speed: 222 km/h (at 500 m)/138 mph (at 1640 ft)
Minimum Speed: 115 km/h (with 11,230 kg AUW) / 71 mph (with 24,757 lb AUW)
Ceiling: 4,450 m (14,560 ft)
Climb Time: 7 min to 2,500m (8202 ft), 34 min to 4,000 m (13,123 ft)
Range: 1,550 km (963 miles) [12,000 kg (26455 lb) AUW]
Take-off Time: 40 sec [12,050 kg (26,565 lb)], 32 sec [11,650 kg (25,684 lb)]
Crew: Eight
Defensive Armament: 6 x 7.5 mm Darne machine guns
Offensive Armament: 4 x 75 kg (165 lb) G2 bombs

Two Loire 70s of E7 Flight moored on Lake Bizerte.





Loire 70.



Loire 102 *Bretagne*

History

The Loire 102 was initially a commercial flying boat design drawn up in response to the South Atlantic programme of 1934.

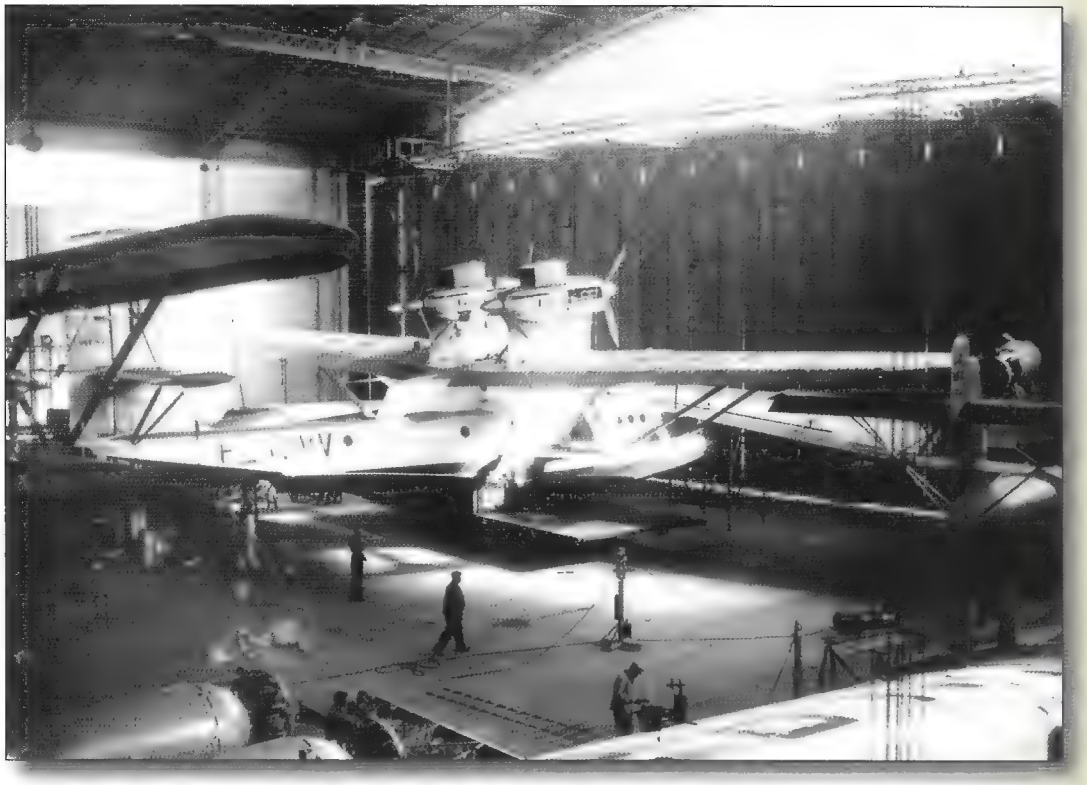
In July 1935, a Government contract was placed with the Loire company, which had its design office and factory at Saint-Nazaire. It was registered as F-AOVV in March 1936 and given the name *Bretagne*. The pilots Sadi-Lecointe and Nadot took it up on its maiden flight on 13 May 1936, then followed a series of tests which showed up a persistent problem of vibrations in the tail unit. The problem was partly solved by moving the faired engine radiators from below the wing to positions above the engine housings.

In April 1937, after eleven months of experiments by the manufacturer, it was sent to Saint-Raphaël for testing at the CEPA under the supervision of *Lieutenant de Vaisseau* Hamelet as Reporting Officer. In February 1938, after flight tests studded with incidents, facts had to be faced: in spite of its good characteristics on the water, the Loire 102 would never be suitable for the South Atlantic crossing without major structural modifications, its range being insufficient.

Fuel consumption tests at the CEPA in June confirmed this conclusion and the fact that the Loire 102 would never enter series production as Air France had by now lost interest in it, having by now decided in favour of its competitor, the LeO H-47. As the future of the aircraft was now uncertain, it was initially stored in a hangar at Saint-Raphaël.

In July 1938, the Air Ministry proposed handing over the Loire 102 to the Navy free of charge but the latter, knowing full well the aircraft's characteristics, did not want it. So they offered to take the engines and any other equipment of value and to hand over the rest to the *Domaines* (Government body charged with auctioning off surplus property). But in August 1938, the Ministry for the Navy finally agreed that the naval air base at Saint-Raphaël would take the aircraft on charge.

Loire 102 Bretagne *before the war, registered F-AOVV, in its final configuration with rectangular vertical tail plane, seen at Marignane.*



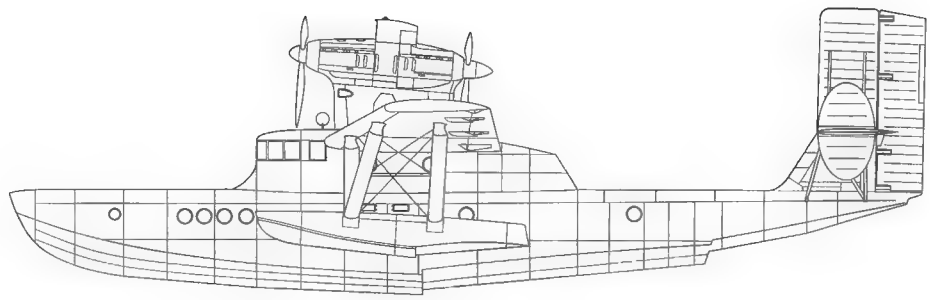
Loire 102 Bretagne *F-AOVV, in the Marignane hangar (1938) with some LeO H242s of Air France, and one Breguet* Saigon.

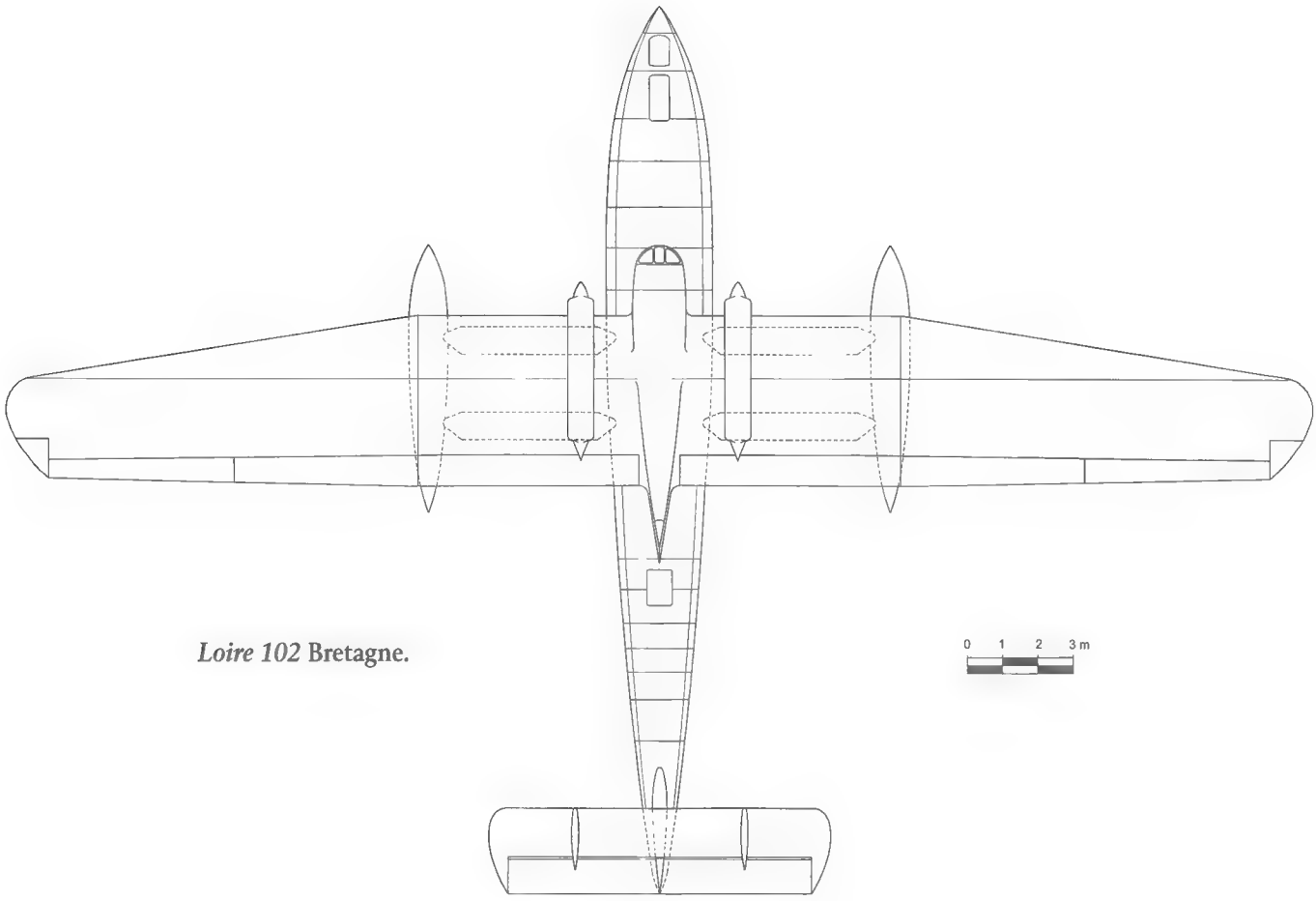
Given the arrival of the CAMS 141 and a Loire 70, there was no more room in the hangar at the base so the Loire 102 was stored on land in the open. On 20 August, the commander of the *Escadre Volante de la Méditerranée* proposed the integration of the Loire 102 into his units as a 'Command aircraft', also proposing the removal of fuel tanks in the hull since its range would even then be quite sufficient for operations in the Mediterranean.

However, at the end of August, the Admiralty finally decided to put the flying boat at the disposal of the Vice-Admiral, Commander in Chief of the Atlantic Squadron, allocating it to Flight E4 based at Lanvéoc-Poulmic (Brest). The Admiralty considered, in effect, that the Loire 102 could *'in its present state, be of use to the Navy for certain command liaisons and other missions'*, despite its limited range.

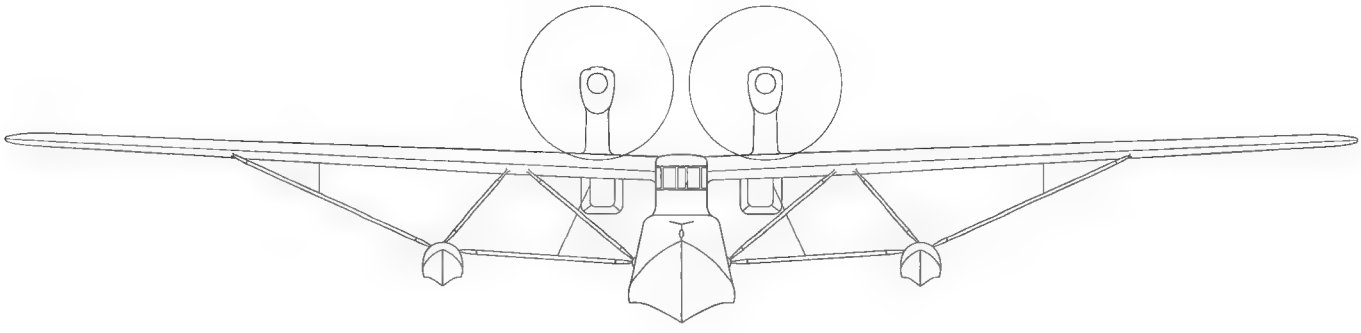
On 1 October 1938, the Loire 102 was flown by a naval crew from Saint-Raphaël to Lanvéoc-Poulmic, its new base. In October, it was listed in the armament plan for 1938 as *'liaison aircraft for the Atlantic Squadron'*.

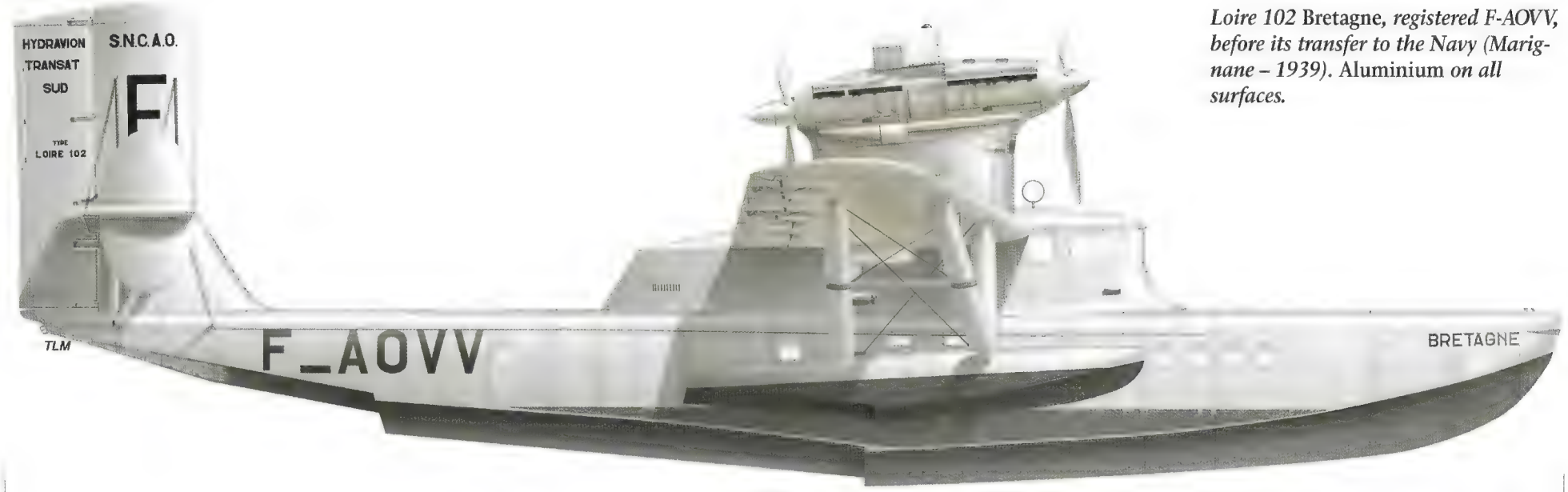
A view of the Loire 102 showing the two cooling radiators placed above the engine nacelles. These caused serious vibrations in their previous position below the wings.





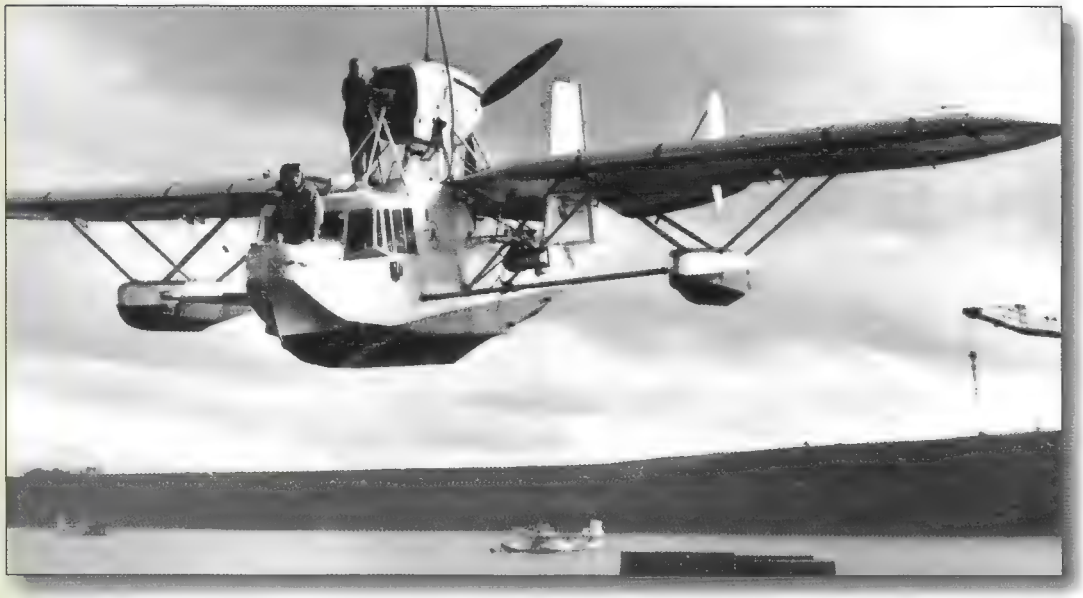
Loire 102 Bretagne.





Loire 102 Bretagne, *registered F-AOVV, before its transfer to the Navy (Marignane – 1939).* Aluminium *on all surfaces.*

Engine inspection at Marignane. Note the ground handling undercarriage.



A final view of the Loire 102 before its destruction. It is seen here in the background on the water at Lanvéoc-Poulmic, below the hull of a Loire 130 suspended from a crane. Coded HS4.2, the latter aircraft served on board the Georges Leygues. *A Latécoère 523 can be seen on the left (late 1939).*

But at the beginning of December 1938, *Contre-Amiral* Michelet, head of *Aéronautique Navale* services, wrote a letter to the Air Ministry expressing reservations concerning the use of the Loire 102, particularly concerning *'vibrations which had not been entirely eliminated during testing'* and the fragility of its hull *'given the high take-off speed and requiring major repairs to the hull'* as well as *'further modifications and new installations to be carried out, their execution entailing great expense'*.

In April 1939, the Loire 102 was noted by Flight E4 as being *'out of commission'* and *'waiting for a decision'* on its fate. It was finally written off in administrative terms at the end of June 1939, probably without ever having been used operationally by the unit for which it was intended.

The Navy finally found some use for it during the second half of 1939, employing it for *'testing possibilities for towing seaplanes not under power by naval vessels'*. But before these tests began, the Loire 102, by now stripped of its engines, broke its mooring lines under a strong east wind and finally washed up on the coast of Brittany and was destroyed on 1 March 1940.

Civil Programme: Contract N° 580/5 of 6 July 1935 (Order for one Loire 102)
Manufactured: One
In *Aéronautique Navale* Service: One (1939 – 1940)
Unit: Flight E4
General Characteristics: (Loire 102 Bretagne)
Four-engine metal-hulled flying boat
Engines: 4 x 720 hp Hispano-Suiza Xirs.1
Propellers: 3-bladed Ratier, pitch adjustable in flight
Length: 23.5 m (77.09 ft)
Span: 34 m (111.54 ft)
Height: 7.70 m (25.26 ft)
Wing Area: 136.54 m² (1469.75 sq ft)
Empty Weight: 10,100 kg (22,267 lb)
Laden Weight: 18,530 kg (40,851 lb)
Maximum Speed: 262 km/h (163 mph) at sea-level
Ceiling: 4,600 m (15,092 ft)
Climb Time: 39 min to 4,000m (13,123 ft)
Range: 4,900 km (3045 miles)
Crew: Four
Defensive Armament: None
Offensive Armament: None

Loire 130

Technical Programme Origin

The technical programme which gave rise to the Loire 130, evolved from specifications drawn up by the French Admiralty in a memorandum dated 5 April 1930 (N° 599 E.M.G.1): this called for a *'surveillance seaplane, either with floats or a flying boat'* carrying a crew of two or three, having an all-up weight of three tonnes and a maximum speed of 180 km/h (sub-type IX in the surveillance category).

According to the Navy, the aircraft should have folding wings and be capable of replacing the Gourdou 810 or the FBA 17 H.L.2. It was intended to serve on board 10,000 tonne cruisers and the seaplane tender *Commandant Teste*, then nearing completion.

For reasons of manoeuvrability, the 'flying boat' concept was considered preferable in comparison to a floatplane, as was an air-cooled engine, viewed as being more reliable than a water-cooled alternative. In 1931, *Capitaine de Vaisseau* Lartigue of the Maritime Air Forces Directorate drew up a new general equipment programme calling for the following improvements regarding Class IX aircraft: *'speed range, seaworthiness and distance covered'*. The missions required of this category were clearly specified as *'surveillance and artillery fire control'*.

On 21 June 1932, the Admiralty published a further note concerning all naval aviation technical programmes (D.M. N° 314 E.M.G.3). The characteristics required of Class IX remained unaltered, though it was added that, from now on, these aircraft would need to develop further their

A fine view of the prototype Loire 130, showing off the complicated architecture of this little flying boat.

Loire 130 N° 18 seen at Saint-Nazaire while undergoing cooling tests and fitted with a new form of engine nacelle. (Photo: 'Je me souviens' Association*).*

'range and ability to land and manoeuvre in choppy seas' since they would be required *'depending on circumstances, to be able to reach a friendly coast or to touch down in open seas close to their mother ship and be hoisted aboard'*.

The future seaplane should have an endurance of five hours at 150 km/h, be capable of operating between sea level and 3,000 metres and be capable of reaching this maximum height in 25 minutes; dimensions were also to be limited to a weight of three tonnes, wingspan ranging from 6 m (folded) to 16 m (deployed) and a length of 11.5 metres.

In broad terms, the main improvement required was to extend operating range beyond that of the Gourdou 810 and 811 (four hours at 150 km/h). Capability to carry only one 75 kg G2 bomb was required but crew comfort was not overlooked since 'padded and elastic' seats were called for to absorb shocks better during take-off by catapult.

On 23 May 1933, the Navy Ministry sent its Air Ministry counterpart a general study programme (D.M N° 384 E.M.G.3) covering all future aircraft requirements, including the *'marine surveillance seaplane also capable of carrying out artillery fire control and bombing attacks on submarines and light vessels'*.

The details of this aircraft were not finally fixed until 28 July 1933 at a meeting of the Air Ministry's *'High Consultative Commission for Military, Naval and Colonial Aircraft Construction'* charged with drawing up the details, these being quickly approved by *Général* Denain, Chief of General Staff of the *Armée de l'Air* [1].

Maximum speed at sea level was now to be greater than 200 km/h and the operating ceiling, now put at 3,500 metres, was to be reached in 45 minutes. Take-off in still air was not to exceed 20 seconds. In terms of flying qualities, the order of preference was *'speed range, manoeuvrability at all speeds and climb time'*. Sea worthiness requirements were *'capability of take-off and touch down in very choppy seas, behaviour when moored and when adrift, and ability to move to shelter'*.

In October 1933, the Navy asked that the length of the future aircraft be finally limited to 11 metres to make shipboard handling easier.

1. At the time, the Navy was unable to place direct orders with manufacturers for the types of aircraft it would like to buy. The Air Ministry, through its 'Directorate of Aircraft Construction' had this monopoly and it controlled the technical programmes drawn up in response to naval requirements. It then took charge of the execution of orders placed with the aircraft manufacturers by allocating the various Government contracts corresponding to orders placed. It is not difficult to imagine the complexity of this system and the difficulties which it inevitably caused for the Navy.

At the same time, the completion of the aircraft, envisaged for 1934, was now given the third degree of priority by the Admiralty, behind the attack aircraft and the bomber seaplane but ahead of the catapultable fighter.

In December 1933, the size of the future seaplane was revised to allow an additional 40 cm in height but only 3 cm more in width with wings folded. From that point onwards, the ball was in the court of those manufacturers who might be interested and six of them responded to the call for offers.

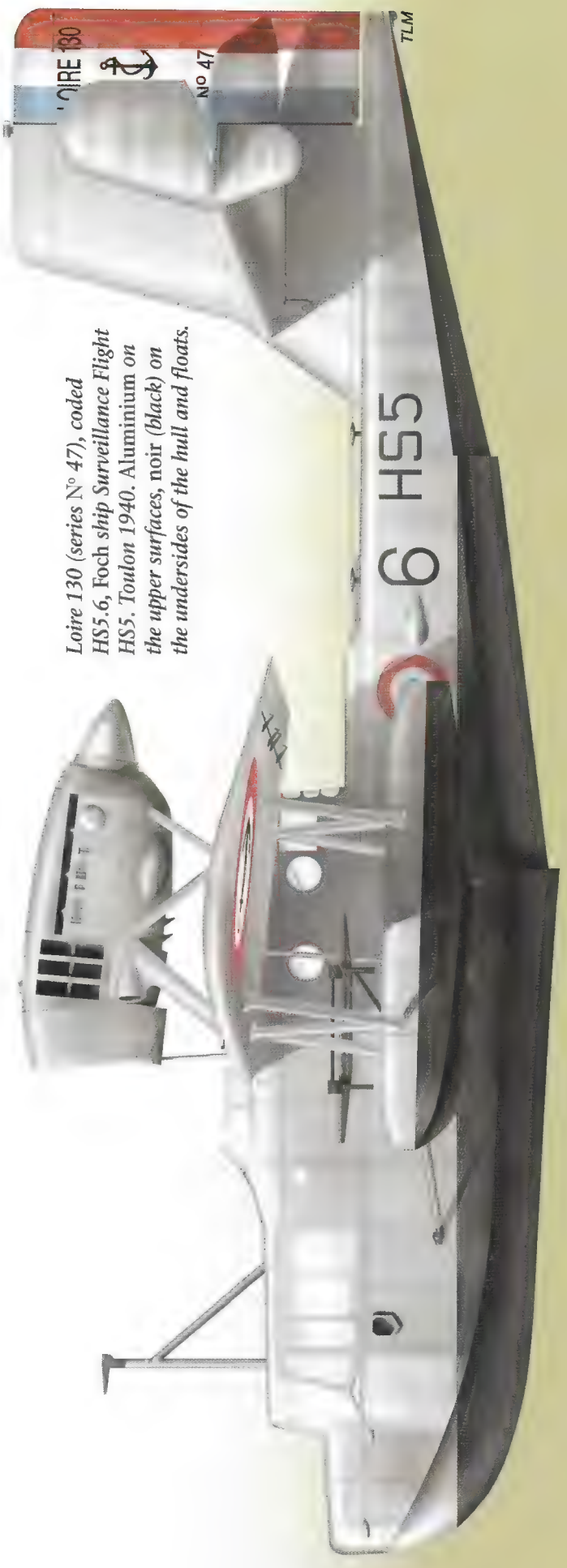
All the manufacturers opted for a monoplane but only two chose the flying boat formula, these being the *Ateliers et Chantiers de la Loire* with their type 130 and CAMS with their model 120. The others went for the classic twin float formula and put forward their prototypes – Gourdou-Leseurre GL.820, Breguet 610, Levasseur PL.200 and Lioré & Olivier LeO H-43. Finally, four of the six aircraft were abandoned and remained at the single prototype stage, their test results being unconvincing[2].

The Loire 130 and the LeO H-43[3] were the only two aircraft resulting from this programme to enter series production and see service during the Second World War.

History

Construction of the Loire 130 N° 01 began at the Saint-Nazaire factory in the spring of 1934 under the direction of Yves Jan-Kerguistel. Its layout was similar to that of the flying boats already developed by this design office, that is to say, a central hull with floats and a high mounted monoplane wing as for the Loire 50 and 70.

The prototype made its first flight at Saint-Nazaire on 19 November 1934, with Jan-Kerguistel as pilot and Gon (mechanic) and Malingé (flight engineer) as crew. The works pilot Pierre Nadot flew it to the CEPA at Saint-Raphaël on 3 January 1935.[4]



Loire 130 (series N° 47), coded HS5.6, Foch ship Surveillance Flight HS5. Toulon 1940. Aluminium on the upper surfaces, noir (black) on the undersides of the hull and floats.

2. Due to its high weight, it proved impossible to launch the CAMS 120 by catapult. The Breguet 610 and the PL.200 (the latter being damaged during the manufacturer's own testing programme) were never passed to the CEPA for testing. Three GL.820s were ordered but they did not meet stress tests and ended their days at the CEPA.

3. 21 examples of the Lioré & Olivier H-43 floatplane were manufactured. Their history is recounted in another volume in this series.

4. Following the practice at the time and as with other contemporary seaplane programmes, the order for the prototype Loire 130 was only regularised ex-post by the signature of a contract notified almost a year and a half after the aircraft's first flight.

The aircraft's performance turned out to be better than that required by the specification: the maximum specification speed of 200 km/h was exceeded by 23 km/h while in the 45 minutes required to reach 3,500 metres, a height of 5,860 metres was attained. Suffice to say that the aircraft amply met the sailors' hopes, apart from the fact that the engine radiator was subject to repeated leaks. In November 1935, a series of catapult launches were made from the *Commandant Teste* in Saint-Mandrier bay; these went off without incident. In January 1936, the prototype went back to Saint-Nazaire, where it was again tested in a series of launchings from a Penhoët catapult mounted on a quay in the port.

These initial tests on the prototype were followed by other catapult launchings from ships of the line *Montcalm* and *Gloire* in mid-1937. Once these were completed, it went back to the factory in November 1937 for a considerable number of modifications.

This extensive period of testing (3 years!) considerably retarded the service entry of the Loire 130. But on the whole, the aircraft had largely met the programme requirements and could be named as the winner, even to the point at which the Navy noted in its handbook on the type, citing it to be *'both stable and manoeuvrable, with excellent flying qualities'*. Its direct competitor, the LeO H-43, ended up with no more than about twenty entering service or one-sixth of the ultimate production quantity of the Loire 130. Given the promising results obtained by the prototype, the Navy placed an initial order for 20 aircraft in November 1935, increased to 40 in May 1936.

This first lot was finally confirmed in July 1936 with a contract for 45 aircraft composed of 40 type '*Métropole*' and five '*Version Coloniale*'[5]. The latter were intended for service in Indo-China with the 5th Flight of the *Armée de l'Air*. The latter differed in having a radiator of greater frontal area, a larger engine oil reservoir and a dorsal turret differing from the '*Métropole*' version in having a 7.5 mm MAC 34 in place of a Darne.

A rare colour view of the prototype at Saint-Nazaire, taken from a 16 mm film. It is shown here with its pilot, Pierre Nadot.

5. Contrary to affirmations by some authors, the term '*Métropole*' was used officially by SNCAO and was mentioned clearly in production contract clauses, this being to indicate the difference between this version of the Loire 130 and the other version, the '*Colonial*'.

The '*Colonial*' version of the Loire 130 was initially developed to serve with the *Armée de l'Air* for operation from its overseas bases; this requirement entailed modifications to improve engine cooling but this version was also put into service with the Navy. Between November 1936 and October 1938, three additional contracts for the Loire 130 were signed with SNCAO (ex-Loire) for a total of 94 aircraft, 25 being for the '*Colonial*' version.

Incidentally, delivery of the first 45 aircraft was 11 months behind schedule, this leading to the transfer of the Director of the Saint-Nazaire factory for reasons of inefficiency. The first series example of the '*Métropole*' version (N° 2 in the series) made its first flight from Saint-Nazaire in the hands of Pierre Nadot on 10 August 1937, while the first *Colonial* example followed on 28 April 1938 (flown by Pierre Habert).

By the time the war began on 3 September 1939, 70 of the '*Métropole*' versions and 12 '*Colonials*' had been delivered from Saint-Nazaire.

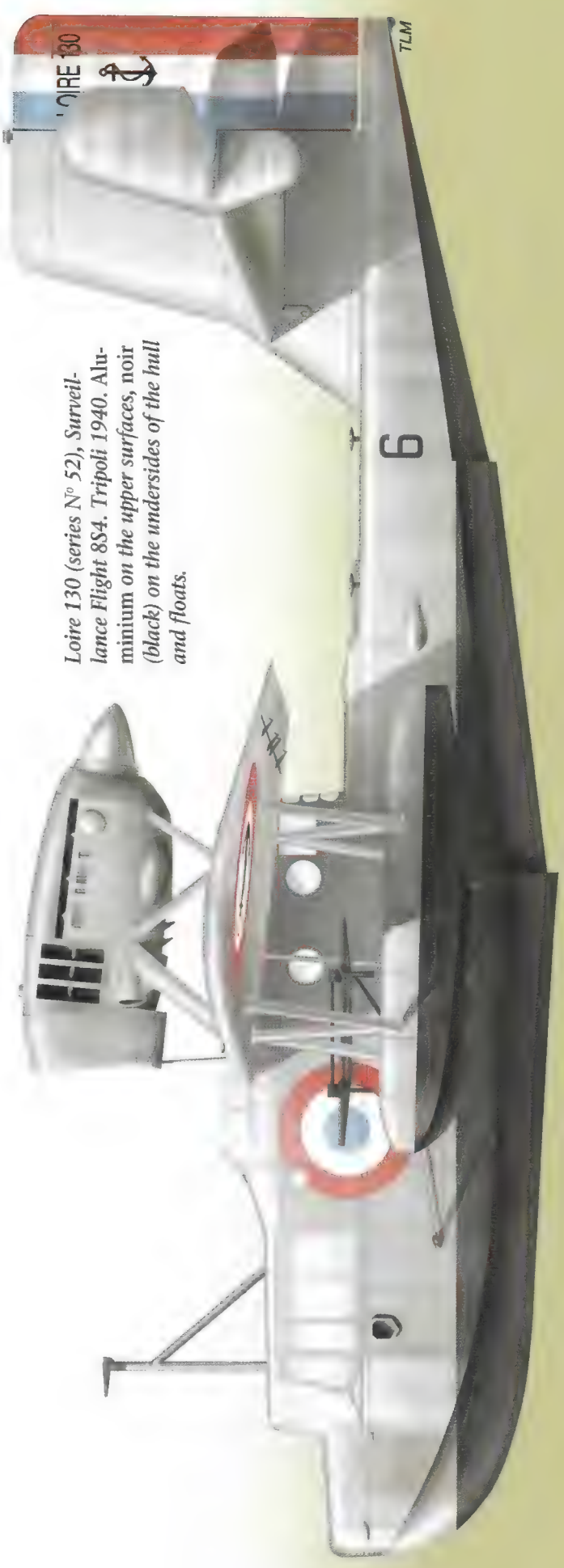
Ships of the line were the first to receive the Loire 130 with N° 2, the first of the initial order for 45, joining the *Dunkerque* (future flight 7S4) in December 1937, followed by Flight 7S2 with the *Commandant Teste* in April 1938.

In the following years, at least twenty cruisers and other ships of the line received the little Loire flying boat, replacing the antiquated Gourdou-Leseurre GL 810[6]. By January 1939, around fifty Loire 130s were operational, mostly with the fleet.

By the beginning of the war, about fifty were serving with Flights 1S1 (Cherbourg), 2S4 (Lanvéoc-Poulmic), 3S6 (Aspretto), HS1 (*Commandant Teste* at Oran), HC2, HS2, HS4 (Atlantic Fleet), HS5 and HS3 (Mediterranean Fleet), HS6 (Far Eastern Naval Forces) and HS7 (cruisers and colonial sloops). Up to that point, only one Loire 130 had been lost at sea during a forced landing off the Corsican coast in April 1939. Another broke in half while being catapulted from the *Duquesne* on 3 May, but the outbreak of war altered matters.

During the first four months of the war, three more Loire 130s were lost on operations, two of them from the same unit (HS2). The first of these was seriously damaged during a catapult launching from the cruiser *La Marseillaise* in the port of Bizerta on 5 September (Flight HS3).

6. The price of a GL 810 (710,000 Francs) was nevertheless in no way comparable with that of a Loire 130 or a LeO H-43, their value being 1,600,000 Francs in 1939.



Loire 130 (series N° 52), Surveillance Flight 8S4. Tripoli 1940. Aluminium on the upper surfaces, noir (black) on the undersides of the hull and floats.

The second was lost on 7 September after being launched by catapult from the *Dunkerque* on a reconnaissance mission; the five crew members were lost, these being the first by the *Aéronautique Navale* since the start of the war. The third was lost after a forced landing at Crozon caused by running out of fuel while going to search for the preceding aircraft; no crew members were lost on this occasion.

On 13 June, two aircraft of Flight HS3 attached to the cruisers *La Galissonnière* and *Jean de Vienne* operating in the Mediterranean were the first Loire 130s to bomb an enemy submarine but without being able to confirm its destruction. A further four aircraft of the type were lost in accidents up to the end of fighting in June 1940; two were lost in April due to engine failure and a third was damaged when touching down at Ajaccio on 24 June.

At around 18:00 on the same day, the fourth aircraft crashed into the sea on a final search for an enemy submarine off Arzew (Algeria); three members of the crew were lost, including the HS1 flight commander (*L.V.* Le Roux). By a strange turn of fate, the first *Aéronautique Navale* losses during the war were on the Loire 130 and the last before the cease fire in June 1940 were also on the same type.

It would be impossible to recount here all details of operations by the Loire 130. Suffice to say that the type continued flying after the Armistice and that there were many adventures, some of them dramatic.

The type continued in service with Flight 17S at Fort de France in the French West Indies, with 19S at Tripoli in the Lebanon, with 18S, 4E and 1S as well as with two reconnaissance sections at Dakar-Bel-Air and with the Naval Seaplane Section (S.H.M.) in Indo-China. On 3 July 1940, a formation of three Loire 130s of HS1 based at Arzew fruitlessly bombed British warships which had just attacked the French fleet at Mers-el-Kebir.

A rear view of Loire 130 N° 6, code SR.5, attached to the CEPA at Saint-Raphaël. It shows details of the engine nacelle supporting struts and the tail plane.

On the following day, an aircraft of Flight HS4, operating from the cruiser *Georges Leygues*, dropped two G2 bombs on a British submarine which had just torpedoed the colonial sloop *Rigault de Genouilly* off Algiers. On 11 July, a Loire 130, belonging to 8S3 based at Dakar-Bel-Air, hit the sea during a night flight due to the closure of a fuel supply tap by mistake; two crew members were killed.

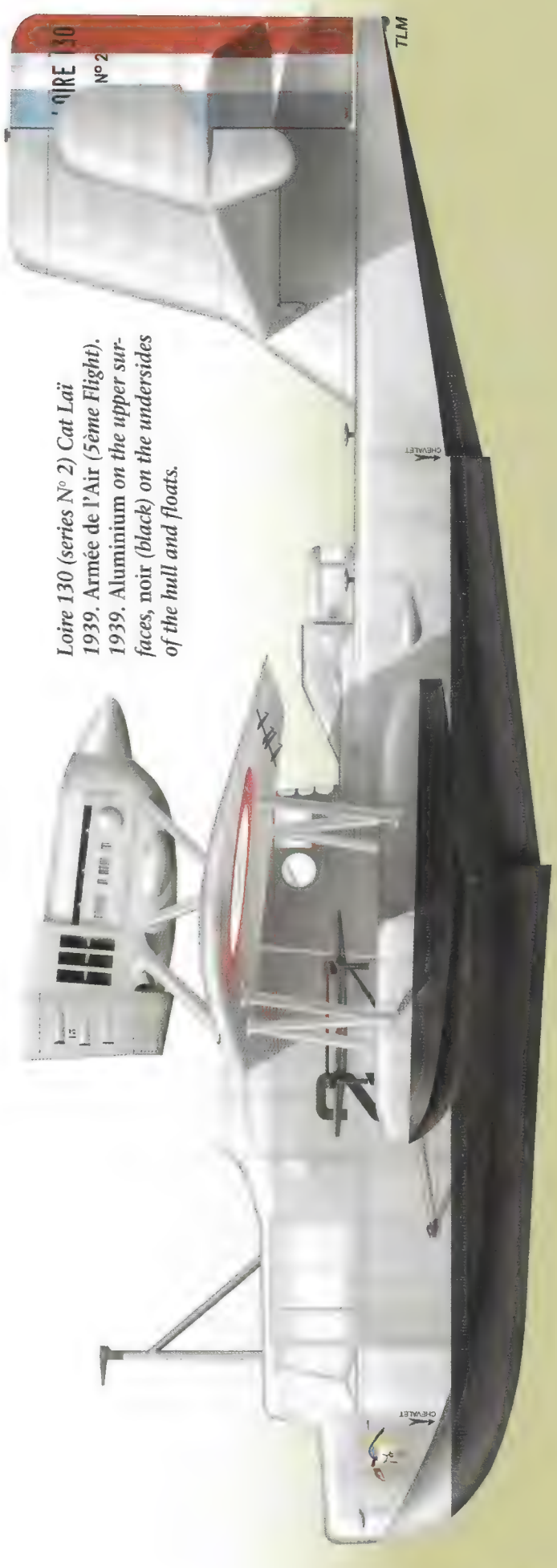
When Dakar was under attack by the Royal Navy on 24 September, *L.V.* De Boislisle created a sensation by taking off in a Loire 130 of 4E in the midst of columns of water raised by 380 mm shells fired by the enemy. Unfortunately, two days later, Loire 130 code 4E.5 was shot down off Dakar by an *Armée de l'Air* Dewoitine 501 (Flight I/6) which mistook it for a British *Walrus*, killing three crew members.

1940 came to a tragic end with the loss of Loire *Colonial* N° 24 (4E.6) which crashed into the sea while flying at night from Dakar-Bel-Air on 11 December, killing two naval personnel, including *L.V.* De Boislisle.

The occupying power, on the lookout for aircraft for its air/sea rescue units, took a keen interest in the Loire 130. One aircraft (series N° 75) was taken from the Saint-Nazaire factory by the *Luftwaffe*. Given an initial code DI+XA, later changed to BI+XA and German markings, it was flown to Germany in April 1941 where it underwent a long series of tests at Travemünde with the *Erprobungstelle* (German equivalent of the CEPA). However, as a result of these tests, the idea of allocating the aircraft to an air/sea rescue flight (*Seenotstaffel*) was abandoned and no other Loire 130 was used operationally by the *Luftwaffe*.

During 1941, the occupying power authorised the completion of around twenty Loire 130s which had been abandoned nearing completion in the Saint-Nazaire factory at the end of June 1940. These were part of Contract 2056/9 for 150 aircraft signed in 1939. The last of these to be completed (series N° 80) had been flown out from Saint-Nazaire to Hourtin *in-extremis* by Raymond Creton on 19 June.

SNCASO was given a new contract (176/41) to oversee the completion of these 20 Loire 130s, aircraft numbers 105 to 124 (series N°s 75, 81 to 99). It should be noted that SNCAO, the successor to the Loire company, was wound up after the



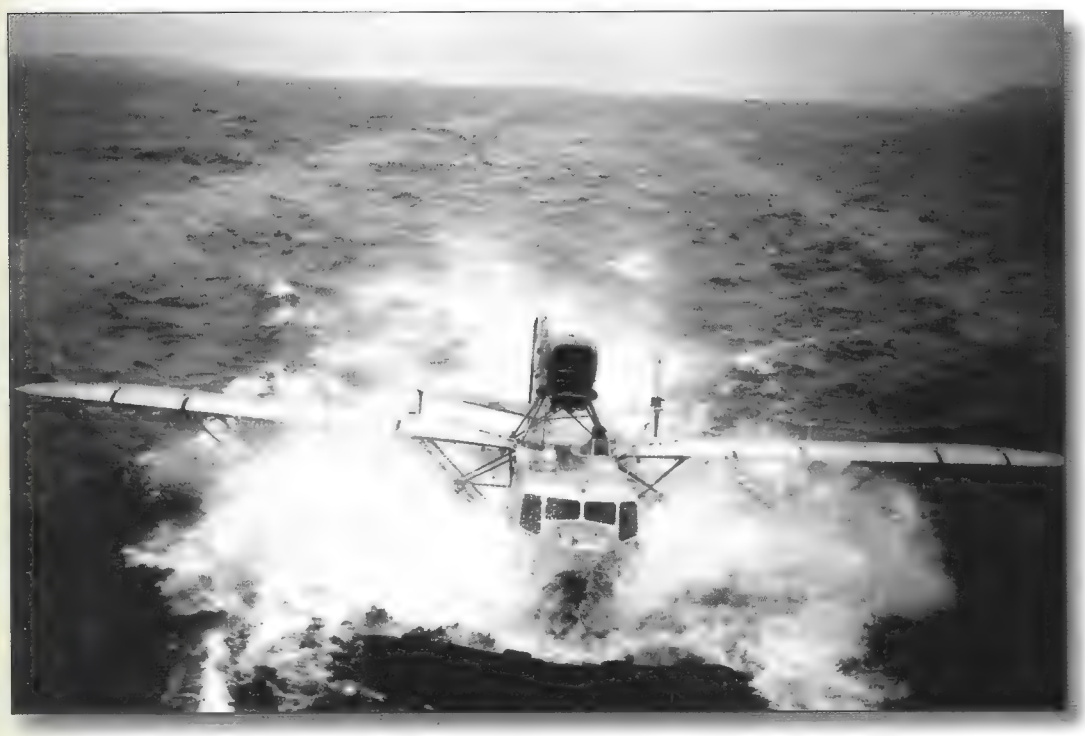
Loire 130 (series N° 2) Cat Lai 1939. Armée de l'Air (5ème Flight). 1939. Aluminium on the upper surfaces, noir (black) on the undersides of the hull and floats.

Details of the system for attaching a Loire 130 (code HS2.3) to its catapult on board the Strasbourg.

Armistice and its assets were taken over by SNCASO following a decision by the Board of Directors of the latter company in January 1941.

This was how SNCASO came to produce this additional series of Loire 130s at Saint-Nazaire. Between March and September 1942, these were all flown to Berre with a technical stopover at Mâcon on the river Saône, north of Lyons. They took off from Saint-Nazaire in the occupied zone, flown by the pilot Arthur Surtel, requisitioned for the task. They were at first given temporary flight markings applied with water based paint! These consisted of the code numbers 10, 11 or 12 applied repeatedly to groups of three aircraft. German markings were carried and parts of the aircraft were painted in a yellow-orange colour for identification purposes.

On arrival at Macon, these markings were easily washed off, to be replaced by French roundels. An *Aéronautique Navale* pilot then took over to fly each aircraft to its final destination at Berre.



Spectacular photo of an attempt to pick up a Loire 130 from the sea by a battleship using a beaching ramp.

Loire 130 type 'Métropole', *manufacturer's number 61, code HS2.4 (battleship Strasbourg – 1939).* Aluminium *on the upper surfaces,* noir *(black) on the undersides of the hull and floats.*

Loire 130 type 'Colonial' *N° 14 coded 17S.2 (Flight 17S – Fort-de-France – 1942).* Aluminium *on the upper surfaces,* noir *(black) on the undersides of hull and floats. Red/yellow Vichy markings on engine nacelle and tail surfaces.*

A Loire 130 embarked with the training ship Jeanne d'Arc *in Tunisia during 1941. Note the regulation yellow and red stripes, including those on the radiator cowling.*

These twenty Loire 130s were eventually seized there by the Germans when they invaded the unoccupied zone in November 1942 and they never entered service with the *Aeronautique Navale*.

Around fifty Loire 130s, including the additional series of 20, were in the unoccupied zone at that time and all of these were ceded by the Germans to the Italians, who eventually scrapped them during 1943 without finding any operational use for them.

The Loire 130 was also widely deployed in the most remote operational theatres. One of the most unusual units was not part of the Navy but the *Armée de l'Air*; this was the '5th Indo-China Flight', later named the '1st Southern Bases Flight' (1/CBS) initially based at Cat Laï, using a dozen Loire '*Coloniaux*' from 1938 to 1945. Finally, there was the ephemeral FAFL (Free French) detachment, equipped with a single Loire 130 at Pointe-Noire (Congo). The Loire 130 was quite an exotic aircraft.

Between 1940 and 1941, three Loire 130s succeeded in escaping with their crews to join the Free French forces. These were one aircraft from the *Richelieu*, another from Flight 17S and the third from Flight 19S.

By the beginning of 1945, only a dozen of these aircraft were available. After the war, only two units and three Naval Air Bases (Arzew, Aspretto and Cat Laï) continued to fly the Loire 130 until the extinction of the type. The first unit was Flight 8S based at Cat-Laï, which was allocated two aircraft as from the end of 1945 up to December 1949. The second was 53S at Hourtin, which had four aircraft for training seaplane pilots as from 1946, these being finally put into storage to await scrapping in January 1949. The last unit to employ the Loire 130 was the Naval Air Base at Cat-Laï, where series N° 69, coming from Flight 8S, was allocated at the beginning of 1950, this being the last of the type in existence. It made its last flight in June of the same year, thus bringing to a close the eventful career of the Loire 130 with the *Aéronautique Navale*.

During its service, no less than twenty Loire 130s were lost in accidents or in action; two were destroyed at anchor at Tripoli by Allied fighters, leading to the loss of twenty naval personnel. While these losses were far from negligible, they were not so high given the intensive use of the Loire 130 throughout its career and the large number of these aircraft in service with the *Aéronautique Navale*.

This small flying boat certainly achieved the most important technical and commercial success of any product of the Loire design office, even though in use it was considered to be 'relatively

Two 'Colonial' *version Loire 130s of Flight 8S4 based at Tripoli (Lebanon) before the Armistice. This view gives an impression of the larger radiator and the rear turret which distinguish them from the* 'Métropole' *version. Note also the unusual position of the roundel on the forward fuselage.*

Loire 130 N° 56 (code HS4.4) serving with the cruiser Gloire, *seen at Brest at the end of 1939. Climbing up all that scaffolding to get to the pilot's cockpit could not have been an easy task.*

fragile'. But, in the view of the Navy and its designers, it had to face up to *'the maximum weight limit for an aircraft operating from a ship and as a result, it could not take any further reinforcements'*, given the modest power of catapults at the time.

Air Ministry Contracts for Loire 130

Contract N° 331/6 of 26/05/36 (contract for one prototype 01)
Contract N° 578/6 of 29/07/36 (order for 40 '*Métropole*' and 5 '*Colonial*', aircraft N°s 1 to 45)
Contract N° 974/6 of 16/11/36 (order for 10 '*Métropole*'; aircraft N°s 46 to 55)
Contract N° 520/7 of 19/03/37 (order for 12 '*Métropole*' and 8 '*Colonial*'; aircraft N°s 56 to 75)
Contract N° 1352/8 of 21/10/38 (order for 12 '*Colonial*' and 7 '*Métropole*'; aircraft N°s 76 to 94)
Contract N° 2056/9 of 27/10/39 (order for 150 aircraft, N°s 95 to 245 – cancelled)
Contract N° 176/41 of 20/08/41 (Completion of 20 '*Métropole*' of contract 2056/9; aircraft N°s 105 to 124)

*Note: A specific detail; on manufacture of the Loire 130s, they were given two sets of numbers by the factory. This was because the two types ('*Métropole'* and '*Colonial'*) came off the line in no particular order and according to the detailed clauses of each contract, they were then separated out according to type. Thus, SNCAO gave each aircraft a chronological number, irrespective of type (the 'aircraft number'). This went from 1 (in effect the prototype 01) to 124 (the last aircraft to be manufactured). However, the Loire 130s '*Colonial'* (a total of 25) were given separate sequential numbers though their* 'aircraft or manufacturer's number' *was evidently different on the production line. As a result, the 'series numbers' of '*Métropole'* aircraft delivered to units and painted on the rudder or not, as the case may have been, stopped at number 99 in 1942; to this must be added the 25 '*Colonial'* type, leading to a total of 124 Loire 130s manufactured.*

Manufactured: 124 (99 '*Métropole*' and 25 '*Colonial*')
In Service with the *Aéronautique Navale*: 93 (80 '*Métropole*' and 13 '*Colonial*')
Units: Fllights CEPA, HS1, HS7, 1HS, 1S1, 1S, 2S4, 3S, 3S6, 7HS, 7S2, 8S, 8S2, 8S3, 8S4, 17S, 18S, 19S, 53S, SS.4E, *Flottille* F1H, Naval Seaplane Section (*S.H.M.*), S.E Brest, S.E Saint-Mandrier, Mediterranean Squadron, Atlantic Squadron.

A rare view of Loire 130, manufacturer's N° 75, seen at Saint-Nazaire in March 1941. It bears the temporary code DI+XA, later changed to BI+XA, before its transfer to Germany. It was the only aircraft of this type to be tested by the occupying power. (Photo: 'Je me souviens' Association).

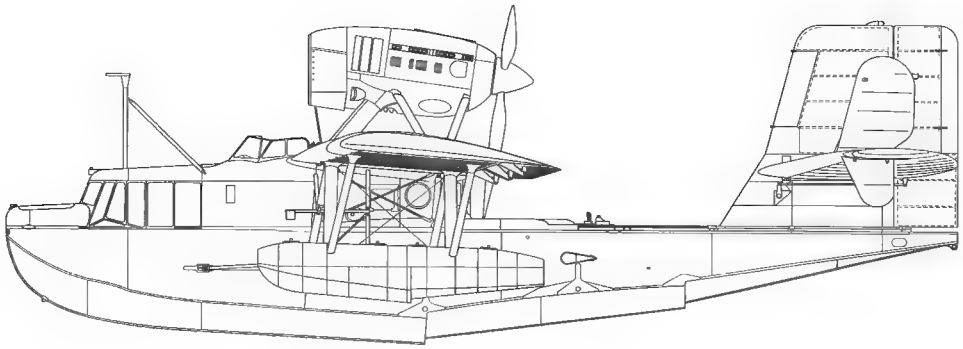
A Loire 130 coded 53S.30 of the pilot training flight 53S at Hourtin, which used four Loire 130s from 1946 to 1949.

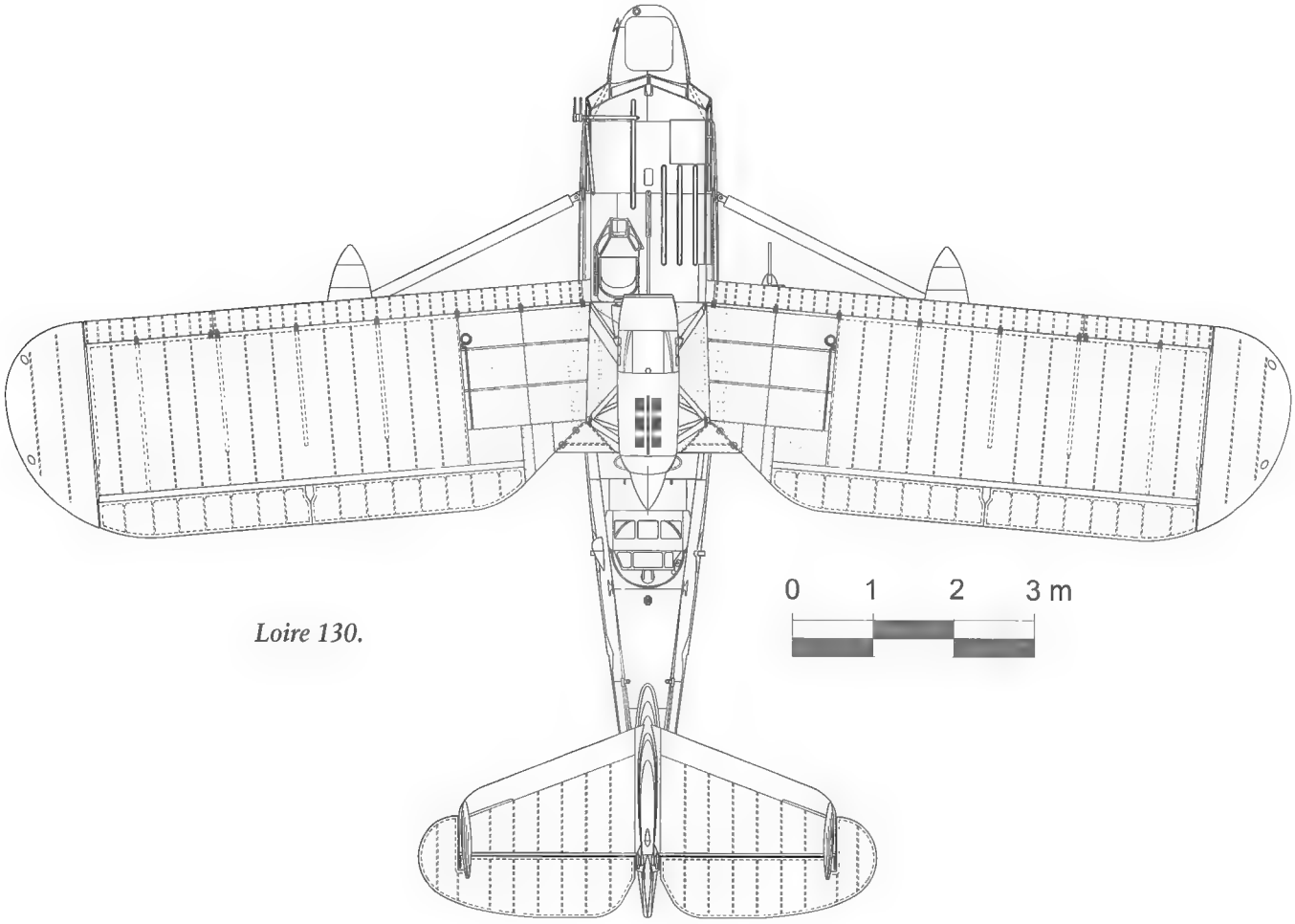
Other Users: FAFL Detachment, 5th Indo-china Flight (*Armée de l'Air*), *Luftwaffe* (*Erprobungsstelle* Travemünde)

On Naval Vessels: *Algérie, Colbert, Commandant Teste, Dunkerque, Duquesne, Dupleix, Foch, Georges Leygues, Gloire, Jeanne d'Arc, Jean de Vienne, La Galissonnière, Lorraine, Marseillaise, Montcalm, Richelieu, Strasbourg, Suffren, Tourville.*

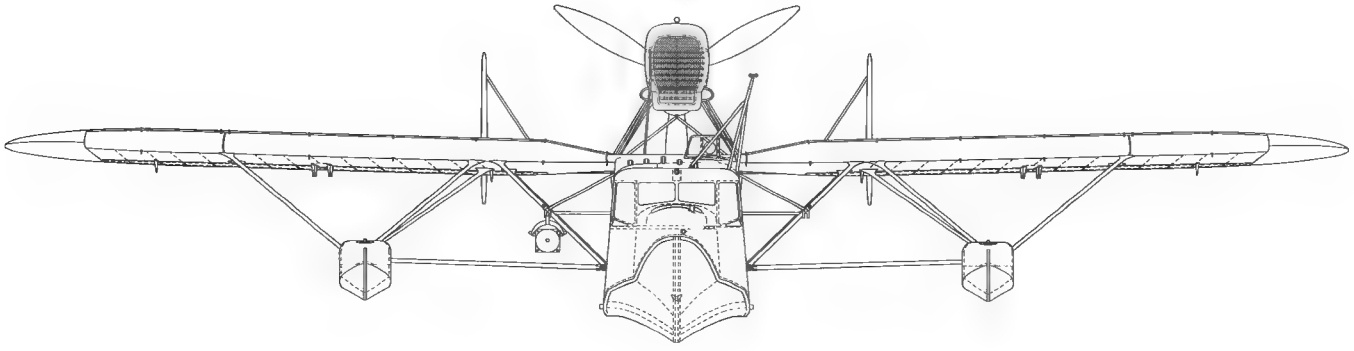
General Characteristics:

Metal hulled monoplane flying boat with floats
Engine: 1 x 720 hp Hispano-Suiza 12Xlrs
Propeller: Ratier three-blade metal type 1321 M, pitch adjustable on ground
Span: 16 m (52.49 ft)
Span (wings folded): 4.70 m (15.41 ft)
Length: 11.30 m (37.07 ft)
Height: 3.85 m (12.63 ft) ['Métropole'], 4.03 m (13.22 ft) ['Colonial']
Wing Area: 8.17 m^2 (87.94 sq ft)
Maximum Weight: 3,475 kg (7661 lb)
Empty Weight: 2,448 kg (5397 lb)
Range: 1,185 km (7h.25min at 160 km/h) / 736 miles (7h.25min at 99 mph)
Maximum Speed: 211 km/h (131 mph)
Minimum Speed: 106 km/h (66 mph)
Climb Time: 1 min41 sec [to 500m (1640 ft)], 39 min34 sec [to 6,000 m (19,685 ft)]
Theoretical Ceiling: 6,500 m (21,325 ft)
Crew: Three
Defensive Armament: 2 x 7.5 mm Darne machine guns (nose and dorsal) or 7.5 mm MAC 34 ('Colonial' version)
Offensive Armament: 2 x 75 kg (165 lb) G2 bombs





Loire 130.



Loire 501

A Private Venture

At the beginning of the 1930s the '*Société Anonyme des Ateliers et Chantiers de la Loire*', commonly referred to as the '*Société Loire*', decided to diversify its aircraft manufacturing activities beyond landplanes (the Loire 10 colonial aircraft and the R.N.3 night reconnaissance machine) towards seaplanes. Its first choice was a single-engine amphibian of simple construction, the Loire 50. The Loire design office intended it for use by the Navy, for colonial operations and for civil use. Even though its concept was simple, the new aircraft benefited from a hull made of duralumin[1] and folding wings to broaden its applications. From the start, the manufacturer adopted a proven engine in the 250 hp power range and stressed easy maintenance of the airframe along with good seaworthiness characteristics for the hull. The Loire company summed up the potential applications of the aircraft as follows:

'*For the* Aéronautique Navale*: Seaplane training at sea and liaison; for Colonial Aviation: limited military operations, liaison, photography and radio; for civil use: local postal lines, aerial surveys and seaplane flying training.*'

By broadening the field of applications of the Loire 50, the manufacturer hoped for the widest possible industrial success. Although it was not part of any official programme, the aircraft appeared as a worthy successor to the CAMS 37, already in service with the *Aéronautique Navale*, including armed reconnaissance capability.

1. At that time, metal hulls had only begun to be introduced on heavy military flying boats such as the three-engine Short Calcutta. Until then, they had only been tested in France on a single-engine Latham biplane flying boat in 1923, followed by a FBA 17 in 1927 and the unique Paulhan-Pillard E.5, accidentally destroyed in 1929. A German metal-hulled Rohrbach Romar flying boat was under tests at Saint-Raphaël in 1931. Small flying boats used for training, such as the CAMS 37, had wooden hulls.

Loire 501 (series N° 7) coded SM12, of training Flight Saint-Mandrier before the war.

Loire 501 coded SM.2 serving with the Saint-Mandrier training section, alongside a CAMS 37 Lia *of the same unit.*

History

An initial contract for a single Loire 50 powered by a Salmson 9 Ab engine rated at 230 hp was awarded to the Loire company in March 1931 for a total value of 778,000 Francs. The aircraft was built at the Loire factory at Saint-Nazaire which was specially equipped for the manufacture of sea-planes. The first flight of the Loire 50 was made by Yves Jan-Kerguistel, Technical Director of the Loire seaplane design office, at Saint-Nazaire on 7 September 1931.[2]

It was noted that the maximum speed was around 160 km/h. Take-off at minimal weight took 18 seconds and 31 seconds when fully loaded (AUW 1.960 tonne). Take-off and landing on the sea was possible with the undercarriage raised, the hull proving to be perfectly watertight.

Loire 501 N° 4 at Bizerta – Karouba (future BZ-31).

2. The engineer Yves Jan-Kerguistel, one of the most notable seaplane design office chiefs of his generation, was himself an experienced seaplane pilot. During the First World War, he had fought as a naval aviator, reaching the rank of *Enseigne de Vaisseau*.

The aircraft was flown to the CEPA at Saint-Raphaël on 26 January 1932 to undergo official testing. It did not fail to arouse the Admiralty's interest, mainly due to its metal hull. Once these tests were completed, the Loire 50, which by now had completed more than 300 hours in the air without major incident, was sent back to the Saint-Nazaire factory in June 1933. There it underwent a general servicing, improvements to its centre of gravity and fitting of a Hispano-Suiza 9 Qdr engine rated at 350 hp with a metal airscrew. It was now redesignated Loire 50 *bis* and went back to Saint-Raphaël in July 1934.

In spite of its improved performance, the position of the centre of gravity was still considered unsatisfactory and the aircraft was sent back to the factory again before returning to the CEPA at the end of 1934. In April 1935, the CEPA gave its final verdict. *L.V.* Hamelet reported that *'the aircraft's flying qualities are not those which an aircraft should have in 1935. Nevertheless, it is seaworthy and robust and can certainly be operated in waves 50 cm high'*. In October 1933, while the prototype Loire 50 (future 50 *bis*) was being modified at Saint-Nazaire, a further six aircraft, identical to the modernised version but now named Loire 501 and numbered 2 to 7, were ordered by Government contract at a unit price of 354,450 Francs.[3] They benefitted from a strengthened airframe and a reinforced undercarriage, giving them capability of exceeding 2 tonnes fully laden. The hull was now to be made of Védal instead of duralumin.[4]

The fitting of a Hispano-Suiza 9 Qdr engine in place of a 9 Qd was adopted, as were trapezoidal tail surfaces. The Loire 50 seemed to have been cured of its initial defects and the Admiralty was considering ordering a series of 60 aircraft.

However, budgetary constraints limited the series to the six already on order, all of which were taken on charge at Escoublac airfield

Loire 501 N° 3 coded HT 112 (Hourtin – 1940). Aluminium on the upper surfaces, noir (black) on the undersides of the hull.

3. By way of comparison, the price of a CAMS 37 of an earlier concept and of wooden construction was 300,000 Francs in 1929, making the metal hulled Loire 501 an attractive proposition from the budgetary point of view at around 350,000 Francs.

4. Védal or Alclad was a composite, made of a sheet of duralumin, hot rolled between two sheets of pure aluminium. This combination was naturally much more resistant to corrosion by sea-water than duralumin and was widely used in seaplane manufacture.

Loire 501 (series N° 7), codes SM2, before the war, of training flight Saint-Mandrier.

between March and June 1935. The first five were delivered by air to the Navy and allocated to various training sections at Naval Air Bases (BAN), N° 2 going to Lanvéoc-Poulmic, N° 3 to Hyères, N° 4 to Berre, N° 5 to Cherbourg and N° 6 to Orly to serve as advanced trainers for Naval pilots but more widely as liaison aircraft, as with the CAMS 37 *Lia*.

N° 7 was handed over later, this being delayed when the aircraft turned over at Escoublac while being delivered on 15 June. The prototype Loire 50 *bis* was struck off charge in September 1935 after around 450 flying hours of testing and service with the CEPA training section, where it was coded SR.5. Its hull was used for studying the effects of ageing of materials.

In October 1936, after a year's unit service, the Admiralty considered allocating these aircraft to a 'conversion school' at Hourtin but naval airmen were not too keen on the idea. The positioning of the centre of gravity continued to cause problems, sea-worthiness was poor and heavy spray was thrown up when hydroplaning. When the war began in September 1939, four Loire 501s were still in service in the secondary roles of training and liaison: N° 3 at Hourtin (code HT-112), N° 4 at Bizerta-Karouba (code BZ-31), N° 6 at Lanvéoc-Poulmic (code BR-3) and N° 7 at Saint-Mandrier (code SM-12). On 7 May 1940, N° 7 was flown to the Hourtin Naval Air Base (*BAN*) followed by N° 6 on 5 June; both of them, along with N° 3 were allocated to the 'Navigating Personnel School' in a fruitless attempt by the Admiralty to train new seaplane pilots in the midst of the debacle. Activity on the part of the Loire 501s ceased with the Armistice, as with other *Aéronautique Navale* aircraft and those abandoned at Hourtin, they were seized on the spot by German troops. N° 4, the last survivor, was scrapped at Bizerta-Karouba on the orders of the occupying power in 1941. The Loire 50 was the first seaplane manufactured by the *Ateliers et Chantiers de La Loire*. Its career was brief and unremarkable but, nevertheless, it provided the opportunity for its manufacturer to acquire real technical experience which was essential to reach its position as a recognized supplier to the *Aéronautique Navale*, paving the way towards future industrial success as with the Loire 130.

Loire 501, series N° 3, code HT-112, seized at Hourtin near Bordeaux (Gironde) by the occupying power. A German soldier is happily posing for a classic conqueror's souvenir photo.

Loire 501 assembly line at the Saint-Nazaire factory. The strange semi-vertical bar linking the front of the aircraft to the engine nacelle provided a passage for engine and flying controls.

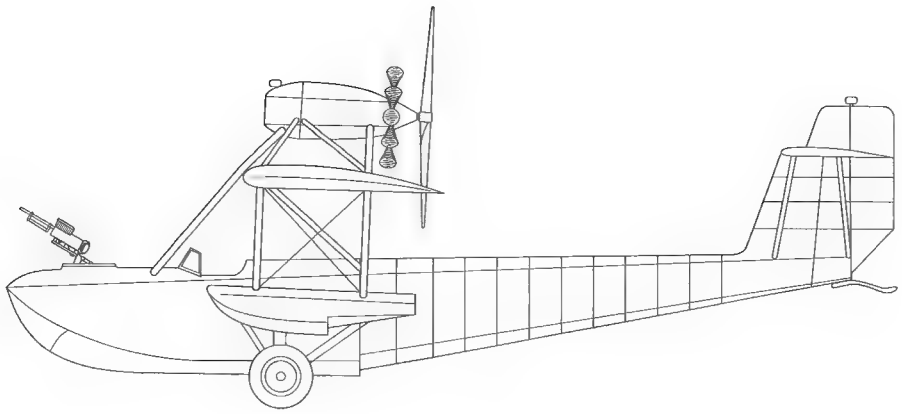
Air Ministry Contracts
N° 957/0 of 31/03/31 (for prototype Loire 50 which became 50 *bis*)
N° 493/3 of 12/10/33 (six series production Loire 501)
Manufactured: Seven (one Loire 50/50*bis* and six Loire 501)
In *Aéronautique Navale* Service: Seven (1932 – 1940)
1st flight Loire 50 N° 01: 07/09/31 Saint-Nazaire (code noted of 50*bis*: SR-5)
1st flight Loire 501 N° 2: 13/03/35 Saint-Nazaire (code noted BR.10)
1st flight Loire 501 N° 3: 22/03/35 Saint-Nazaire (code noted HT.112)
1st flight Loire 501 N° 4: 16/06/35 Saint-Nazaire (code noted BZ.31)
1st flight Loire 501 N° 5: 13/06/35 Saint-Nazaire
1st flight Loire 501 N° 6: 30/04/35 Saint-Nazaire (code noted BR.3)
1st flight Loire 501 N° 7: 29/03/35 Saint-Nazaire (codes noted SM.2, SM.12)

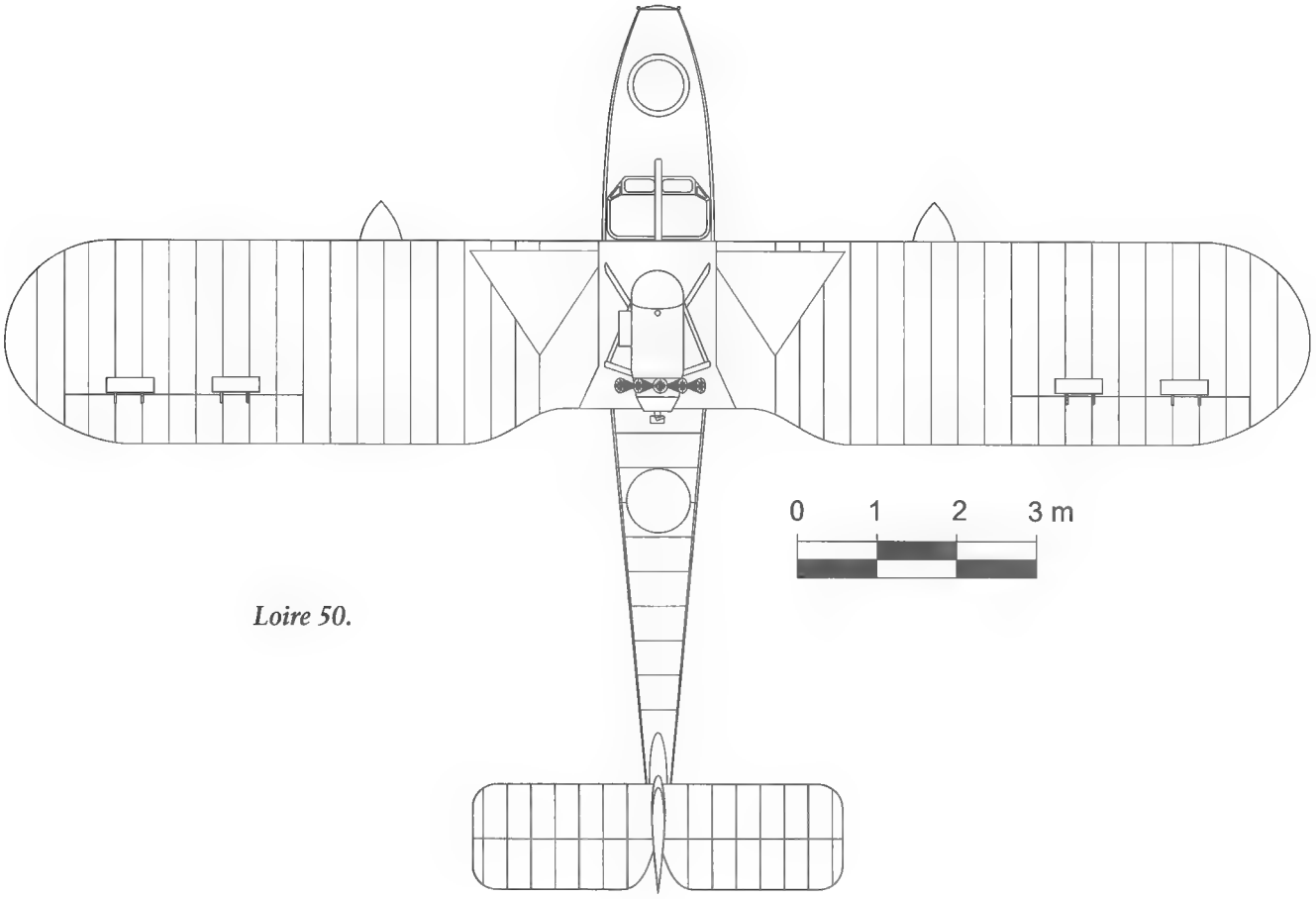
Units: CEPA, Training sections at Bizerta-Karouba, Cherbourg, Hyères, Lanvéoc-Poulmic, Orly and Saint-Mandrier.

General characteristics: (production version)

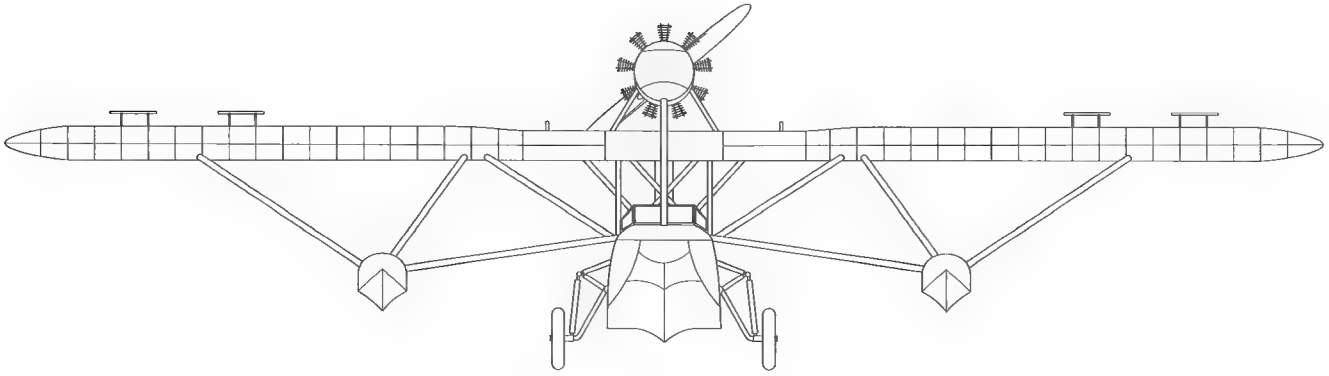
Three-place single-engine monoplane amphibian with retractable undercarriage and metal hull
Engine: 1 x 350 hp Hispano-Suiza 9Qdr (Loire 50bis and 501), 1 x 230 hp Salmson 9AB (Loire 50)
Propeller: Two blade metal Levasseur series 482
Span: 16.02 m (52.55ft) [Loire 50: 16m (52.49 ft)]
Span with Wings Folded: 6.7 m (21.98 ft)
Length Overall: 11.07 m (36.31 ft) [Loire 50: 10.8 m (35.43 ft)]
Height on Wheels and Tail Stand: 4.32 m (14.17 ft)
Wing Area: 39.35 m² (423.57 sq ft)
Empty Weight: 1,310 kg (2888 lb)
Laden Weight (flying boat): 2,200 kg (4850 lb)
Laden Weight (land amphibian): 2,150 kg (4740 lb
Range: Amphibian [3 crew, 2,085 kg (4597 lb)]: 730 km (454 miles) at 153 km/h (95 mph), Flying boat [2 crew, 2,085 kg (4597 lb)]: 1,260 km (783 miles) at 163 km/h (101 mph)
Ceiling: 4,950 m (16,240 ft) [46min 69 sec]: Loire 50: 3,750 m (12,303ft), [49min 47 sec]
Take-off Time (land based): 11 seconds (1,770 kg) (3902 lb)
Take-off Time (flying boat): 18 seconds [1,740 kg (3836 lb)]
Maximum Speed (flying boat): 175 km/h (109 mph) at 2,000 m (6562 ft)
Maximum Speed (amphibian): 165 km/h (102 mph) at 2,000 m (6562 ft)
Take-off Speed: 80 km/h (50 mph)
Crew: 2/3
Defensive Armament: Twin 7.7 mm (.303 inch)Lewis machine guns on removable T.O.7 turret

Loire 501 (series N° 2), coded BR.10, of training flight Lanveoc-Poulmic, before the war.





Loire 50.



Minié-Cassin M.C 10 / M.R 20

Its history is so little known that it could be named 'the mystery seaplane', even to the point of trying to establish the meaning of the initials – M.C – not explained in any of the few documents referring to it. Yet, the aircraft is clearly present in the list of aircraft under construction for the Navy in 1939. The fragments of information which do exist come directly from an interview with its designer Ernest Cassin and from reports issued jointly by the Air Ministry and the Navy.

Technical Programme Origin

The Minié-Cassin M.C 10 was proposed in response to Technical Programme A 49, published in its initial form on 6 July 1937 by the Air Ministry's Directorate of Aircraft Construction and relating to a seaplane in the E.D-2 category, this signifying '*Ecole de Debut biplace*' (two-seat basic trainer). In fact, the origin of this programme could be traced back seven months previously to note N° 108 EMG/AERO.M of 27 January 1937, in which the Ministry of the Navy sent to its Air Ministry counterpart an outline for a pre-project for a basic seaplane trainer in the category E.T-2 (two-seat conversion trainer), prepared in conjunction with the commander of the training school at Hourtin.

The study proposal thus corresponded closely to the needs of the aircraft's future users as it had become necessary to think about replacing the Schreck FBA 17 Type H.E 2 which had been in service for many years. The aircraft would be required for conversion onto seaplanes of student pilots already qualified on landplanes. The relevant clauses of the A 49 technical programme were drawn directly from the pre-project outline and called for '*a single-engine flying boat with a wooden hull and floats, powered by an air-cooled engine relying on standard fuel and driving a pusher propeller*'. Its total weight in flying condition was not to exceed 1,500 kg and it should be easy to get it onto its handling trolley while still in the water. The required cruising speed was only 130 km/h, with touchdown at around 85 km/h. Endurance was to be 4h 30 in the air. To sum up, the Navy's requirement went back to the basics for a training seaplane: simple construction, low price, ease of disassembly and maintenance and easy to fly. The initial construction quantity considered was 100.

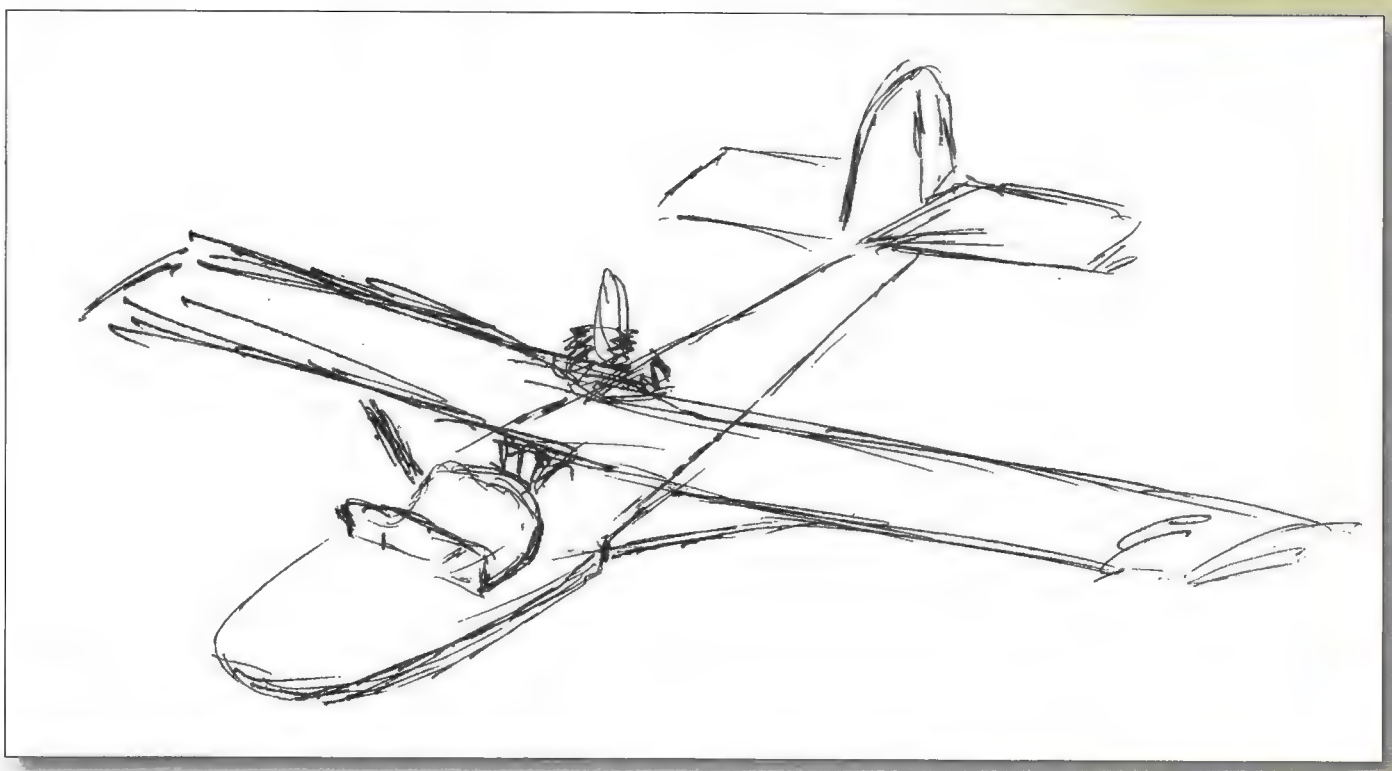
Five competing projects were considered by the CEPANA, all being wooden hulled flying boats. These were the SNCAM/H.D.740 (Dewoitine), the Schreck-FBA 350, the Potez-SNCAN 180, the SNCAO/CAO 30 and the Minié-Cassin MC-10.

History

The project for the Minié-Cassin M.C 10 was presented to the authorities in May 1938. This was to be a wooden hulled flying boat of mixed metal/wood construction with a braced monoplane wing. A 180 hp Bernard air-cooled radial engine was proposed in pusher form, succeeded by a 260 hp Salmson 9 AB-11. It was designed by the engineer Ernest Cassin[1] with the assistance of design draftsman Chalaoux, formerly with Nieuport, in partnership with the French industrialist Victor Minié.

The latter was manager of a factory bearing his name with works at Colombes in the Paris area. This company was initially a specialist manufacturer of foundry moulds for automobile components for the UNIC factory.

1. The engineer Ernest Cassin graduated Sup-Aéro in 1931 and formerly worked at Lioré & Olivier. He died in 1992 but was known in particular for having achieved the world distance record for an aircraft of less than 500 kg on 17 September 1949, when he flew a small single-engine Leopoldoff biplane with a 70 hp Régnier engine from the small airfield at Merville (59), where he was President of the '*Aéroclub de la Lys et de l'Artois*' to the city of San-Sebastian in Spain



A sketch drawn by Ernest Cassin, the engineer at the origin of the M.C.10/ M.R.20, showing the approximate shape of this little-known small flying boat. Its configuration bears some resemblance to the CAO 30.

During 1937, the industrialist decided to diversify his output by moving into the aircraft industry, developing the first French flat four-engine for light aircraft, with a power of 75 hp. In spite of its artisanal (= crude!) appearance, the Navy thought the proposal for the Minié-Cassin M.C 10 trainer sufficiently attractive to ask the Air Ministry to place an order for one during 1938 for the sum of 873,000 Francs.[2]

To manufacture the prototype, Ernest Cassin made a proposition at the end of 1938 to Victor Minié to buy a factory formerly used for the treatment of marine algae on the bay of Aber-Wrac'h in the commune of Landeda in Brittany, where he had family connections.

In February 1939, the Air Ministry's materials committee considered that this factory, located on the water's edge some twenty kilometres north-west of Brest, could be of interest for sub-contracting to its Industrial Technical Directorate. It had the advantage of having a slip for launching seaplanes onto the water, was not located in a high-security zone and was sufficiently close the Lanvéoc-Poulmic base to be used for seaplane maintenance. It also conformed to Government intentions to decentralise military factories as far away as possible from the Franco-German frontier.

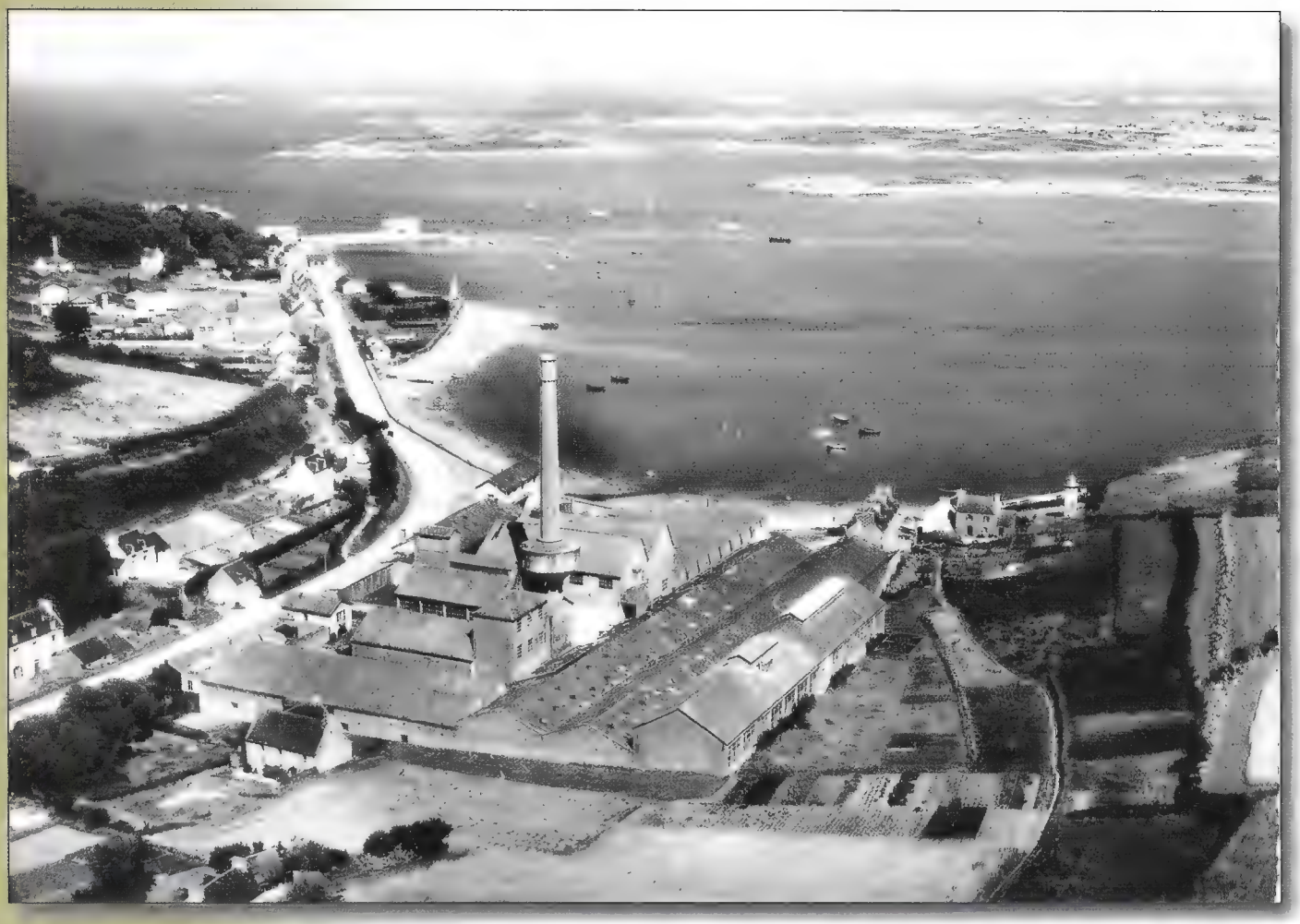
By April 1939, the mock-up of the little flying-boat was finally ready for official examination. At the end of August 1939, Ernest Cassin refused to be classified as working in a 'reserved occupation' and was mobilised as a pilot with the rank of *Enseigne de Vaisseau* and attached to Surveillance Flight 2S1 at Lanvéoc-Poulmic.

At that point, he handed over the programme and the final construction of the flying-boat to the engineer Roux. This was how the Minié Cassin M.C.10 came to be re-designated as the Minié Roux M.R.20, a title by which it was now officially known.

In December 1939, the aircraft was 80% complete and work was continuing at the Aber-Wrac'h factory. It had been planned to begin flight testing by the manufacturer at the end of March 1940 but, as was the case with other French prototypes at the time, these delivery dates were not respected.

On 16 May 1940, in a note entitled 'Simplifications to the *Aéronatique Navale's* materials programme', *Contre-Amiral* Lartigue definitely sealed the fate of the aircraft, stating that '*...the construction of this aircraft must be stopped, along with any final adjustments and testing of the Minié-Roux 20*'. Nevertheless, the exact circumstances of the disappearance of the prototype still

2. By way of comparison, the twin-engine CAMS 55, used for surveillance and training, cost 1,350,000 Francs at the time.



The Aber-Wrac'h factory, recognisable by its tall chimney, located in the commune of Landeda (Brittany) and where the Minié-Cassin M.R.20 was built.

remain unclear in the absence of any reliable evidence. It is only known that the journalist Georges Houard, writing in December 1949 in the weekly magazine '*Les Ailes*' in an article on the Victor Minié factories, claimed laconically that 'the 'mystery flying-boat' was completed and launched onto the water in June 1940, but deliberately sunk on the day before the Germans entered Paris. Even today, this is all that we know...

General Characteristics:

Single-engine wooden hulled monoplane flying boat
Engine: 1 x 230 hp Salmson 9.A6 (M.R. 20), 1 x 260 hp Salmson 9.Ab.11 (M.C. 10)
Length: 9.9 m (32.48 ft)
Span: 15.4 m (50,52 ft)
Height: 3.3 m (10.82 ft)
Wing Area: 31.72 m² (341.40 sq ft)
Total Weight: 1,700 kg (3748 lb)
Crew: Two
Level Speed: 170 km/h (106 mph) [estimated]
Touch-down Speed: 85 km/h (53 mph) [estimated]
Climb Time to 4,000 m (12,123 ft): 38 minutes (estimated)
Take-off Time: 22 seconds (estimated)
Endurance: 6 hours at 140 km/h (87 mph) [estimated]

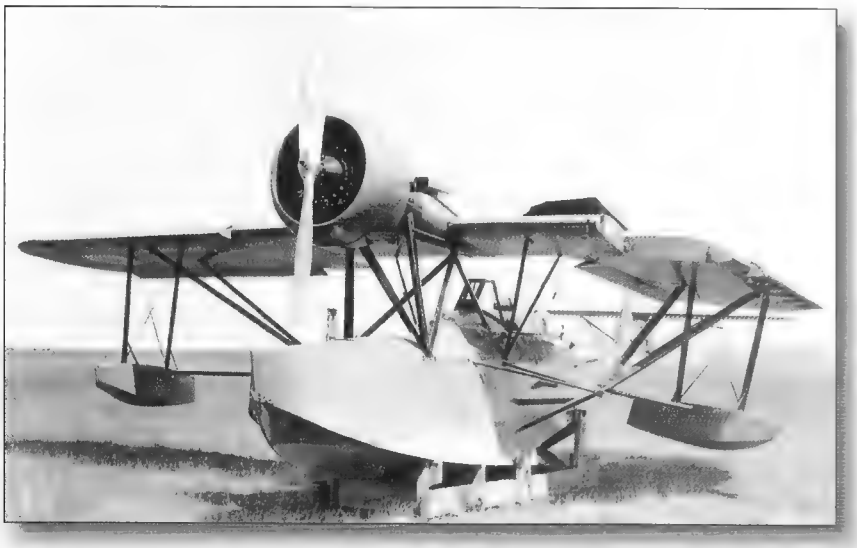
Potez 452 / 453

Technical Programme Origin

The Potez 452 was initially developed in response to a programme for a '*light shipboard observation aircraft*', drawn up in 1931 by *Capitaine de Vaisseau* Lartigue of the Naval Air Forces Directorate.

This requirement was for a seaplane capable of being catapulted, having wings which could be folded and detached and with a crew of two. It was intended for use from cruisers and sloops, fitted with a light catapult capable of launching a seaplane of less than 1,600 kg total weight. This programme became definitive on 21 June 1932. Designated '*Classe IX bis*', a supplementary 'Liaison' capability had been added but those manufacturers likely to be interested (CAMS, Gourdou-Leseurre, Levasseur, Bodiansky and Potez) had already been drawing up their ideas on the subject well before that date. According to the Navy, the FBA type 17 H.L.2 came closest to the requirement but it was now considered to have no military value but it could provide '*a point of departure in the search for improved performance*'.

In one of its technical bulletins, the aircraft constructor Potez clearly summed up the problem faced by manufacturers in responding to this programme: '*to develop a light two-seat aircraft, capable of being conveniently installed on a warship, being catapulted on the high seas and touching down in such conditions in order to be hoisted back on board. The seaplane likely to meet these conditions must not be cumbersome, have folding wings which can be dismounted, be robust and be easy to repair. Its minimum speed should be limited at 83 km/h so that it can be launched by catapult in complete security while a maximum speed of 140 km/h should be sufficient*'.



Detail of the wing folding system on the Potez 45.

The prototype Potez 45 under test at Fréjus – Saint-Raphaël (1933).

The Potez 452 Nº 2, at the SNCAN factory of Sartrouville, ready to be delivered to the French Navy.

Potez 452 Nº 2 of Flight 7S4 (battleship Lorraine*).* Gris bleu foncé *(grey blue) overall, with noir (black) on the undersides of the hull and floats. Engine nacelles* Aluminium *(aluminum).*

History

The prototype of this observation flying boat, designed for the most part by the engineer Delaruelle, was ordered by official contract on 31 October 1931. It received the designation Potez 45 and was built at the company's factory at Méaulte, providing the manufacturer with a real challenge as this was its first flying boat.

The prototype made its first flight at Berre in April 1932, the company having an assembly plant there on the edge of the Vaine lake which had been bought from the Villiers firm. It then went on to undergo testing with the CEPA at Saint-Raphaël in September 1932. At the test centre, it was designated 'Potez 450' in place of '45' used by the manufacturer.

However, the aircraft showed poor seaworthiness, proved seriously underpowered and tended to *'cut into the waves when taking off, like a submarine, instead of passing over the top'* to quote the words of Reporting Officer Nomy.

As a result, the manufacturer was obliged to completely revise the aircraft's concept. This involved lengthening the hull by one metre, redesigning the floats and struts and re-engining with a more powerful 350 hp Hispano-Suiza 9 Qd in place of the initial 230 hp Salmson, the new engine being enclosed in a NACA cowling. The prototype of this completely revised and improved version was tested at Sartrouville as from 13 July 1933 and by the CEPA during 1934. It proved to be satisfactory, having good marine handling qualities, a very wide speed range from 72 to 222 km/h and a ceiling of 5,000 metres, reached in 28 minutes.[1]

However, during testing by the manufacturer, an electrolytic coupling phenomenon, leading to corrosion, had been detected. This arose from the interaction of some magnesium structural panels with the steel screws used to attach them.[2]

The Navy soon placed a contract in July 1935 for ten Potez 452s, these being assembled at the Berre factory. The first series production 'Type 452', as this model was now known

1. The programme called for an altitude of 3,000 meters to be reached in half an hour and the Potez 452 by far exceeded this performance.
2. The electrolytic couple effect between two conducting metals, encouraged by the presence of sea water, was unknown to some design offices at the time.

Potez 452 N° 10 of Flight 8S2 (battleship Aviso Colonial Bougainville) *– 1937. Gris bleu foncé (grey blue) overall, with noir (black) on the hull undersides. Engine nacelles* Aluminium *(aluminium).*

Potez 452 N° 14 of Flight SHM (Section d'Hydravions de la Marine) – *Réam 1940.*
Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the undersides of the hull and floats. Engine nacelles* Aluminium *(aluminum).*

officially, made its first flight on 17 October 1935[3] and was quickly put into service. On 22 January 1936, the Navy ordered six more Potez 452s, numbered from 11 to 16, these being delivered at the beginning of 1937 by SNCAN and no longer only Potez[4]. In February 1936, aircraft N° 10 went to Barcelona for a demonstration on behalf of Spanish Navy representatives, who showed a clear interest in the Potez 452. The aircraft made a good impression but the outbreak of the Spanish Civil War interrupted negotiations for a production licence to be granted by Potez to the Spanish authorities.

In March 1936, the Admiralty decided not to order any more Potez 452s since the aircraft was in competition with the Gourdou 832 which *'essentially met the same requirements, was being produced more rapidly and was already serving in sufficient numbers on colonial sloops'*. It was also considered that the aircraft *'had not yet fully proved itself in operational service'*.

The final misadventure of this limited series, appeared with the Type 453 which made its maiden flight at Sartrouville on 23 September 1935. This was a more powerful version of the 452, fitted with a 720 hp Hispano-Suiza 14 Hbs engine and capable of reaching a speed of 320 km/h. This aircraft was developed in response to a requirement for a *'catapultable fighter seaplane'*.[5] Testing carried out at the CEPA from March 1936 failed to prove conclusive for the Navy which gave its preference to the Loire 210. The Navy was still looking for such a fighter in September 1938 but concluded that, after testing, series production of the Potez 453 was no longer a real proposition.

While the service entry of the Potez 452 posed no problem when embarked on colonial sloops, this was not the case soon afterwards when the type was introduced on battleships as

3. The Type 451 was a project for a Potez 45 equipped with a 300 hp Lorraine 9 Na engine.
4. Following the nationalisation programme for the aircraft industry, this order for six Potez 452, confirmed by contract 593/6 of 8 October 1936, was attributed to SNCAN which took over the orders of the Société des Aéroplanes Potez. However, this final lot of the series continued to be manufactured at Berre, as before. Nevertheless, the Sartrouville factory undertook overhauls of several Potez 452s in December 1937 and January 1938.
5. This type of aircraft corresponded to a programme approved by the Navy on 24 May 1932 but only divulged officially on the following 1st September.

a complement to Gourdou-Leseurre 811/812s and 832s. This forced cohabitation of seaplanes of two different types (floatplane and flying boat) on the same vessel, led to incompatibility with launching trolleys and other catapulting equipment, thus complicating the task of handling crews and extending the time taken for on-board manoeuvring. As from 1936, the Potez 452s were progressively allocated to colonial sloops, only one cruiser remaining equipped with the type.

By the time war broke out, four Potez 452s had already been struck off due to wear or accidents (one in 1937 and three in 1938) and another was in the process. These aircraft were N°s 2, 8, 10, 12 and 13. Though 11 aircraft of the type were still serving with the *Aéronautique Navale*, only two were still on board colonial sloops, these being allocated to HS6 (*Amiral Charner*) with the Far Eastern Naval Forces and HS7 (*d'Entrecasteaux*), the latter soon arriving at Dakar from Lorient. Even before the Armistice was signed, four other Potez 452s (N°s 5, 9, 11 and 15) had been struck off flying records, none of them having taken part in fighting in mainland France.

In October 1940, only three of the type remained in France's African colonies (N°s 3, 4 and 6), two of them being destroyed later at Port-Lyautey in 1942 during air attacks by the US Navy and the remaining example being withdrawn from service before that operation.

In the autumn of 1940, a further three examples of the Potez 452 (N°s 7, 14 and 16) were grouped within the '*Section d'Hydravions de la Marine*' *(S.H.M.)*, newly formed in Indo-china from aircraft taken from two colonial sloops and a cruiser, along with two Loire 130s and a Gourdou 832. Usually based at Cat Laï, this section commanded by *L.V.* Gaxotte, operated from Réam in Cambodia on the Gulf of Siam. There they fought against the Siamese rebellion in January 1941, which was an attempt to get hold of this French colony. The last remaining Potez 452 in *Aéronautique Navale* service was still with the S.H.M at Bien-Hoa in Indo-China in the autumn of 1944.

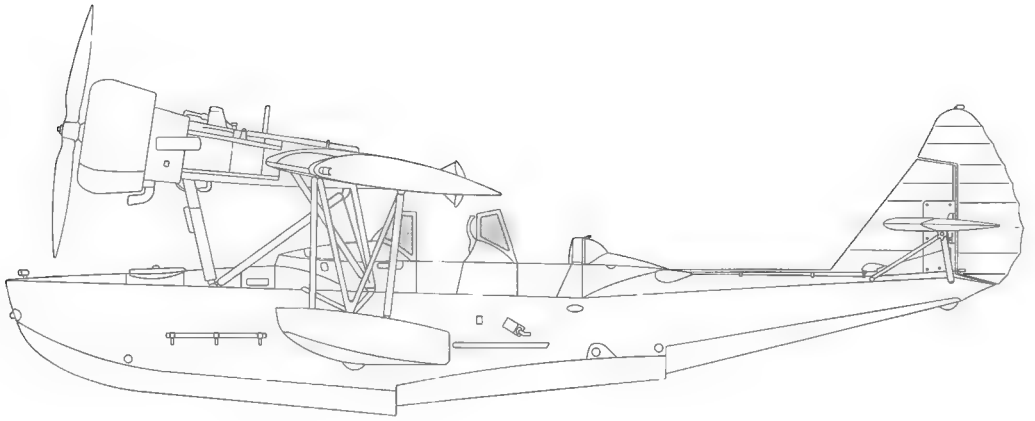
During its nine years on operations, the Potez 452 served reliably with the *Aéronautique Navale*, often thousands of kilometres from

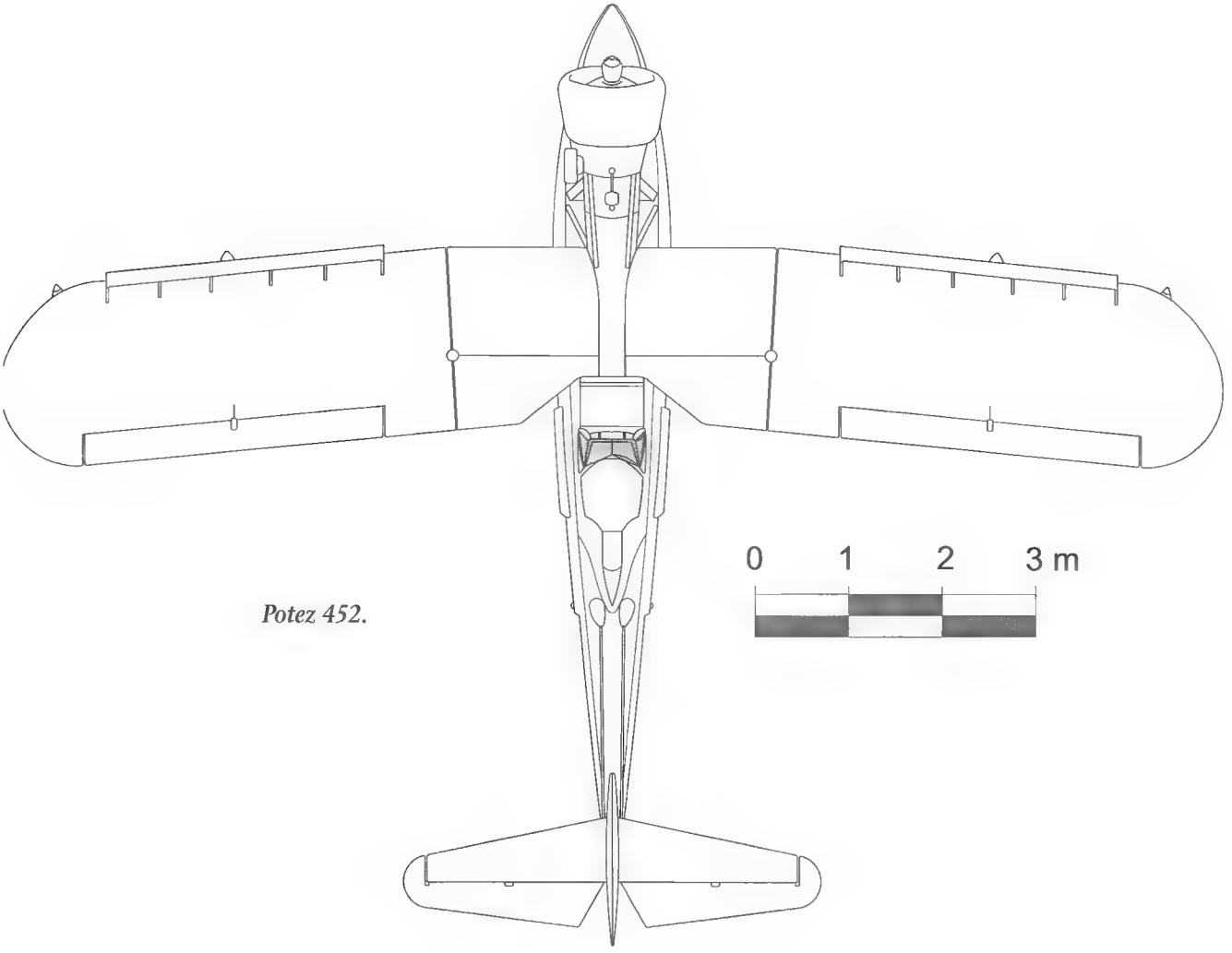
Potez 452 N° 7 of the Naval Seaplane Section (S.H.M.) – Indo-china 1940. Gris bleu foncé *(grey blue) on the upper surfaces,* noir *(black) on the undersides of the hull and floats. Engine nacelles* Aluminium *(aluminium).*

Potez 452 N° 3 with Vichy markings of Battleship Aviso Colonial La Grandière *(Port-Lyautey/Marocco 1942). Gris bleu foncé (grey blue) overall, with noir (black) on the undersides of the hull and floats. Engine nacelles Aluminium (aluminium). On tail and front of engine nacelles (yellow-red) Vichy markings.*

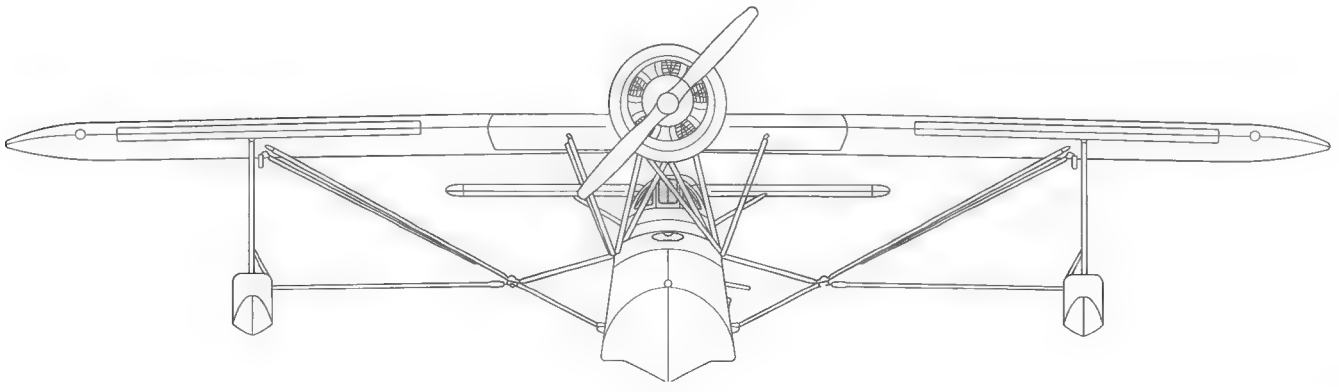
France, playing a secondary role but happily never costing the life of a single sailor.

Air Ministry Contracts
209/1 of 31/01/31 (order for one Potez 45)
328/5 of 27/07/35 (order for ten Potez 452 N°s 1 to 10)
593/6 of 08/10/36 (order for six Potez 452 N°s 11 to 16)
680/6 of 1936 (order for one Potez 453)
Manufactured: 16 Potez 452 and one Potez 453
In *Aéronautique Navale* Service: 16 Potez 452 (1935 – 1944)
Shipboard Flights: 7S4, 8S2, HS6, HS7, *Section d'Hydravions de la Marine*/ S.H.M. (1935 – 1944)
On Board Naval Vessels: Battleship: *Lorraine*
Cruisers: *La Galissonnière*, *Lamotte-Picquet*, *Primauguet*
Colonial Sloops: *Amiral Charner*, *d'Entrecasteaux*, *Bougainville*, *d'Iberville*, *La Grandière.*
General Characteristics:
Wooden hulled single-engine monoplane flying boat
Engine: 1 x 350 hp Hispano-Suiza 9 Qd
Propeller: 1 x two-blade fixed pitch Levasseur
Length: 10.03 m (32.9 ft)
Span: 13 m (42.65 ft) [5.37 m (17.61 ft) with wings folded]
Height: 3.26 m (10.69 ft)
Empty Weight: 1,059 kg (2335 lb)
Laden Weight: 1,500 kg (3307 lb)
Maximum Speed: 222 km/h (138 mph)at sea level
Minimum Speed: 72 km/h (45 mph)
Ceiling: 6,500 m (21,325 ft)
Climb Time: 28 minutes to 5,000 m (16,404 ft)
Take-off Time: 10 seconds
Range: 500 km (311 miles) at 170 km/h (106 mph)
Crew: Two
Defensive Armament: 1 x 7.5 mm Darne machine gun
Offensive Armament: None





Potez 452.



Potez 452, series N° 14, serving with the Entrecasteaux. *Note the insignia present on the bow.*

Potez 452, series N° 15, of the cruiser Lamotte-Picquet *(Indo-china 1939). Note the markings and the narrowness of the pilot's cockpit.*

Potez 452, series N° 7 (Flight HS6) serving with the Amiral Charner *is shown here in an embarrasing position.*

Potez-CAMS 141 *Antarès*

Technical Programme Origin

The Potez-CAMS 141 was developed to meet Technical Programme MP/C.P.T.10 of 1 May 1935 which sought a 'Cruiser seaplane' (Class E). Its direct competitors were the Latécoère 610 (future 611 *Achernar*), the LeO 440 (project later abandoned) and the Breguet 730.[1] In drawing up this programme, the Admiralty was already looking for successors to the Breguet *Bizerte* and Loire 70 'Exploration' class flying boats, even though they had made their first flights barely two years earlier.

History

Under the designation CAMS 141, this flying boat was the latest development of a long line of military seaplanes developed by the design office of the *Chantiers Aéromaritimes de la Seine* under the responsibility of its Technical Director, Maurice Hurel, a highly experienced former naval pilot who had turned industrialist.

A Government contract, valued at 9,400,000 Francs for a single prototype CAMS 141, was placed with the company during 1936. Its construction began at Sartrouville[2] but due to the work-load there, the disassembled components were moved down the Seine to the Caudebec-en-Caux factory during 1937 with assembly continuing there. Following the nationalisation programme, the CAMS 141 was soon re-designated Potez-CAMS 141 and then Potez-SNCAN 141.

1. Refer to Chapter Breguet 730 for data concerning the M.P./C.P.T.10 programmes for 'Cruiser flying boats'.
2. In comparison, unit prices of a Breguet *Bizerte*, a LATE 302 or LATE 523 were respectively 5.44, 7.4 and 14 million Francs; the Potez-CAMS 141 fell within this price range and could not be considered overvalued in view of its technical advance over these three other flying boats of earlier conception.

The Potez-CAMS 141 nearing completion at the Amiot factory at Caudebec-en-Caux. Note the forward firing casement position which has not yet been opened.

Potez-Cams 141 during a test flight at CEPA station (Saint-Raphaël), with civil markings FW-071 (1938).
Aluminium *(on all surfaces).*

Antarès *during tests with the CEPA at Fréjus-Saint-Raphaël, bearing the temporary registration FW-071 (1938).*

Potez-CAMS 141 **Antarès**, *code E8.2 (Flight E8 – Berre 1939).* **Aluminium** *on the upper surfaces. Gris bleu clair (light grey blue) on the undersides of the hull and floats.*

Antarès *bearing its initial military code E8.2 (Berre – 1939).*

At the same time, the Navy placed *Capitaine de Frégate* Raymond Protche, already in charge of following the operational introduction of the first two Breguet *Bizertes*, in command of the future 'Prototype Cruiser Flying Boat Flight' which would include the three prototypes of the three different aircraft adopted. This unit was set up in May 1938.

As usual with a new prototype, Maurice Hurel took up the CAMS 141 on its maiden flight from Caudebec-en-Caux on 20 January 1938, with Yves Lantz as co-pilot and Lambert and Vaubourdollle as mechanics.

The 20 tonne flying boat could be considered as a flying test bed for an even more imposing aircraft: the six-engine Potez-CAMS 161 flying boat, intended for commercial operation across the North Atlantic. The Potez-CAMS 141 itself also represented a minor technical revolution in having three-bladed Ratier electrically operated variable and reverse pitch metal propellers, a world first for a seaplane.

This innovation greatly facilitated manoeuvres on the water and improved security when afloat, allowing the aircraft to move backwards and to turn around virtually on the spot. After some modifications to the hull, the Potez-CAMS 141, bearing the temporary registration FW-071, went to Saint-Raphaël on 21 July 1938 to continue testing with the CEPA. These tests confirmed the aircraft's undoubted qualities, though they were marred by engine failures.

The aircraft was officially taken on charge by the Navy on 18 March 1938 with *P.M.* Constant Simonet as its regular pilot, under the command of *L.V.* Bertin.

The 'Prototype Cruiser Flying Boat Flight' was disbanded in May 1938 and replaced by E8, intended to incorporate four flying boats coded E.8.1 to E.8.4. As of June, the Potez-CAMS 141 was given the code E8.2 and named *Antarès* in reference to the 17th brightest star in the heavens (a fortunate premonition, as the future operational career of the aircraft would show).

During its CEPA tests, the aircraft put in a superb performance, touching down at a maximum weight of 26.5 tonnes and completing the much feared test in taking off in waves of one meter at a weight of over 23 tonnes. Only a long range flight remained to be accomplished. This was made on 30 June 1939 when *Antarès* took off from Lanvéoc-Poulmic for Dakar on a non-stop flight lasting 17h 25 of over 4,000 km at an average speed of 230 km/h. It returned to Berre on the 10 July.

When war broke out on 3 September 1939, *Antarès* was operating from Lanvéoc-Poulmic with the Western Naval Forces and now bearing the code E8.1. But during the first four months of the war, it made only one patrol flight since it had to undergo a major overhaul, having already accumulated around 300 hours in the air.

From January to June 1940, it carried out only 18 war missions, several of them exceeding 15 flying hours but without detecting a single submarine.

In May, it nevertheless dropped six bombs on a supposed 'periscope wake' which turned out, much to the regret of the crew, to have been a superb whale! On 18 June, faced with the onslaught of German forces, *Antarès* took off from Lanvéoc-Poulmic but was caught by the Armistice at Port-Lyautey in Morocco where it had taken refuge. Flight E8 was disbanded on 1st August. At the beginning of September 1940, it was incorporated into Flight 4E based at Dakar and given the code 4E.4.

During the Franco-British naval attack on the port of Dakar on 24 September (Operation *Menace*), the crew of *Antarès* were credited with bringing down a Swordfish biplane from the *Ark Royal* by machine gun fire while still on the water: this victory was shared with Latécoère 302 *Mouneyrès*.

In January 1941, during contact with the enemy (in this case, the British fleet), the aircraft was fired on by a Royal Navy cruiser which it was observing from a distance but fortunately, no damage was sustained. After the Allied landings in North Africa, Flight 4E went over to the Allies and, along with this unit's other large flying boats (LeO 470, LATE 611), continued the struggle against the Axis forces. In particular, it ensured protection for the cruiser *Richelieu* in January 1943 when it left Dakar for America.

Antarès really made history on 2 June 1943 while it was engaged in protecting two convoys sailing off Dakar. At around 12:00 local time, its crew, under the command of *L.V.* Vauchez (pilot

Potez-CAMS 141 Antares *of Exploration Flight 4E. Dakar 1942, with Vichy markings.* Aluminium *on the upper surfaces,* rouge *(red)on the undersides of the hull and floats. On tail and front of engine nacelles (yellow-red) Vichy markings.*

A magnificent view of Antarès *at Dakar (Flight 4E) wearing alternate red and yellow bands and a red lower hull.*

M.P. Roubaud), sighted a submarine beginning to dive two miles ahead and soon dropped four G2 bombs. In spite of the presence of a large oil slick, destruction of the submarine was only confirmed by the British authorities seven months later.

In fact, Potez-CAMS 141 *Antarès* had actually sunk *U-105* type IXB under the command of *Kapitän-leutnant* Nissen, with the loss of its 53 crew members. The submarine belonged to 2.U-*Flotille* based at Lorient. This exploit by the Potez-CAMS 141 made it the only *Aéronautique Navale* seaplane to have sunk a German submarine during the war.[3]

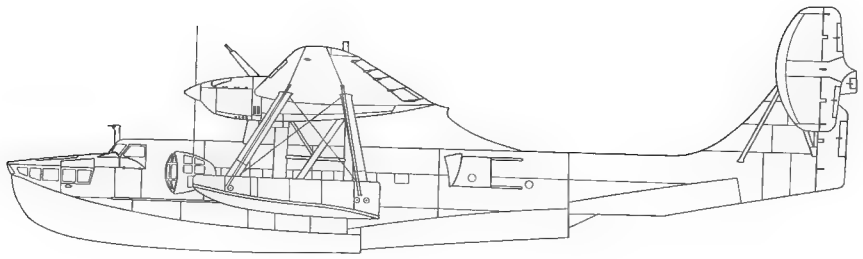
On 19 October 1943, *Antarès*, already written off due to its age, flew with difficulty on three engines from Port-Lyautey to the small port of Arzew in Algeria to be disarmed and scrapped on the spot. During six years of continued activity, it had accumulated a total of 1,300 flying hours, many on wartime missions but, as with other long-range patrol flying boats built in response to the M.P./C.P.T.10 programme (LATE 611 and Breguet 730), it remained the only example of its type. None of the other 30 Potez-CAMS 141s ordered by the Navy before the Armistice saw the light of day, including the three examples which were to be completed by the *Luftwaffe* in 1941, on the basis of three hulls abandoned by SNCAN at Le Havre in various stages of completion.

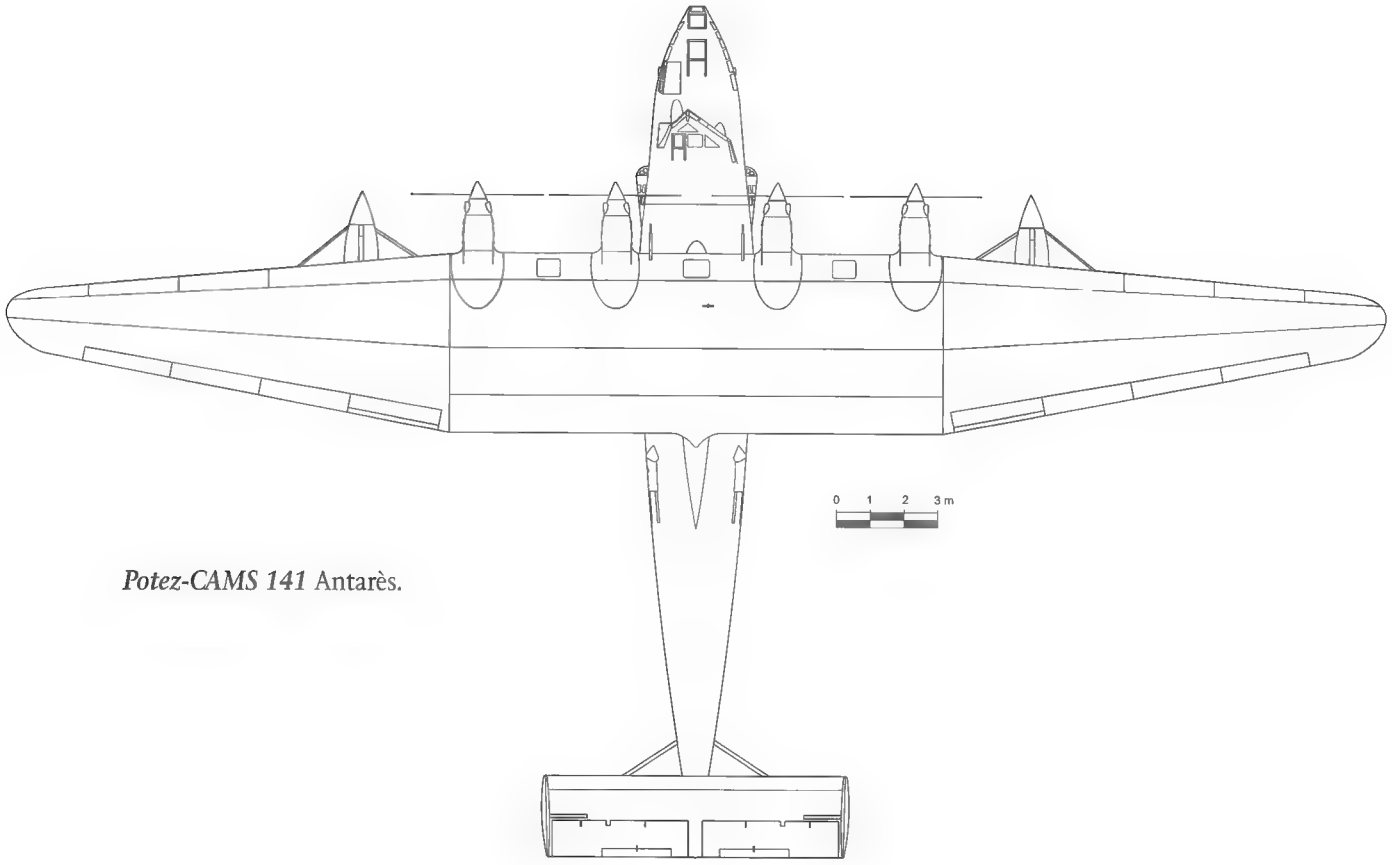
Air Ministry (D.M) and Navy Contracts:

Contract N° 1063/6 of 1936 (order for one prototype)
Contract N° 590/9 of 05/04/39 (order for 4 aircraft)
Contract N° 2097/9 of 19/10/39 (order for 15 aircraft)
D.M. N° 898 EMG Aéro/M of 27/04/40 (order for 31 aircraft)
D.M.N° 1149 EMG Aéro/M of 29/05/40 (order for 11 aircraft – cancellation of 31)

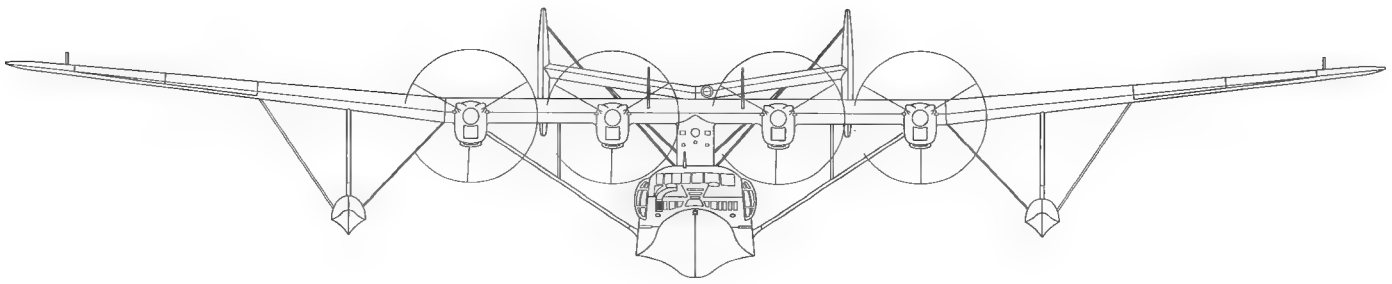
3. Only one other *Aéronautique Navale* aircraft was credited with the destruction of a German submarine. This was a twin engined Wellington bomber under the command of E.V. Bigo, belonging to the 2nd Flotille de Bombardement (2.FB) based at Dakar-Ouakam which sank U-403 (Type VII) off Dakar on 18 August 1943 with the loss of 50 crew members.

March 1940, Lanvéoc-Poulmic. A rear view of Antarès, *carrying only the regulation roundel. Note the opening under the hull, just to the rear of the last step and intended for a Darne machine gun which was never fitted.*





Potez-CAMS 141 Antarès.



Order *Generalluftzeugmeister* N° 341057-RA of 14/11/41: completion of 3 aircraft for the *Luftwaffe* (without follow-up).
Manufactured: One
In *Aéronautique Navale* Service: One
Units (1939 – 1943): Prototype Cruiser Flying Boat Flight, E8, 6E, 4E.
Successive Registrations and Codes: FW-071, E8.2, E8.1, 4E.4, 4E.3, 4E.8.
Given Name: *Antarès.*
General Characteristics:
Four-engine metal hulled flying boat with floats
Engines: 4 x 885 hp Hispano-Suiza 12Y26/27
Propellers: 3-bladed electrically controlled variable and reverse pitch Ratier 1541/1542
Length: 25.2 m (82.67 ft)
Span: 41 m (134.51 ft)
Height: 7.77 m (25.49 ft)
Wing Area: 172 m² (1851 sq ft)
Empty Weight: 14,930 kg (32,915 lb)
Laden Weight: 25,500 kg (56,218 lb)
Maximum Speed: 304 km/h (189 mph) at 1,000 m (3281 ft)
Minimum Speed: 103 km/h (64 mph)
Ceiling: 6,000 m (19,685 ft)[23,100 kg (50,926lb)]
Climb Time: 3 min 30 sec to 1,000 m (3281 ft)
Range: 5,000 km (25,500 kg at 100 knots) / 3107 miles (56,218 lb at 115 mph)
Take-off Time: 24 sec [23,200 kg (51,147 lb)], 35 sec [25,500 kg (56,218 lb)]
Crew: Nine
Defensive Armament: 6 x 7.5mm Darne machine guns mounted in pairs and replacing a naval 25 mm cannon in a dorsal turret (never fitted)
Offensive Armament: 4 x 75 kg (165 lb) G2 bombs [or 225 kg (496 lb) K)

The crew posing on Antarès *at Dakar Bel-Air in 1943 in celebration of their victory over the German submarine* U-105, *sunk off Dakar (Flight 4E).*

Potez-SNCAN 180

The Potez-SNCAN 180 was unusual in that it corresponded to two successive technical programmes and two different configurations (a biplane and then a monoplane flying boat), meanwhile keeping the same designation.

Technical Programme Origin

To begin with, the Potez-CAMS 180 was a project for a wooden-hulled training flying boat with wing floats developed by the former CAMS design office at Sartrouville. This was to be a staggered wing biplane powered by a 210 hp Potez engine. The aircraft was developed in response to programme A49 of 6 July 1937, which called for a 'seaplane basic trainer'. It was in competition with the Dewoitine HD 740, Schreck-FBA-350, CAO 30 and Minié-Cassin MC-10. Design began in December 1937 but was abandoned at the beginning of 1939, having been rejected within the framework of the A49 programme.

Following this, the aircraft was completely re-designed, moving from a biplane to a monoplane configuration and re-submitted to the Navy as a pre-project corresponding to programme A46 of 5 July 1937, which called for supply of '*a coastal observation seaplane also suitable for conversion training*'. It thus became a direct competitor to the Breguet 790 and SE-400. In this configuration, it could be armed with a Darne machine gun at the rear and two others under the wings, as well as carrying an offensive load of two 75 kg G2 bombs. Its engine also differed from the initial project but its wooden airframe was retained, the hull surface being made of moulded plywood.

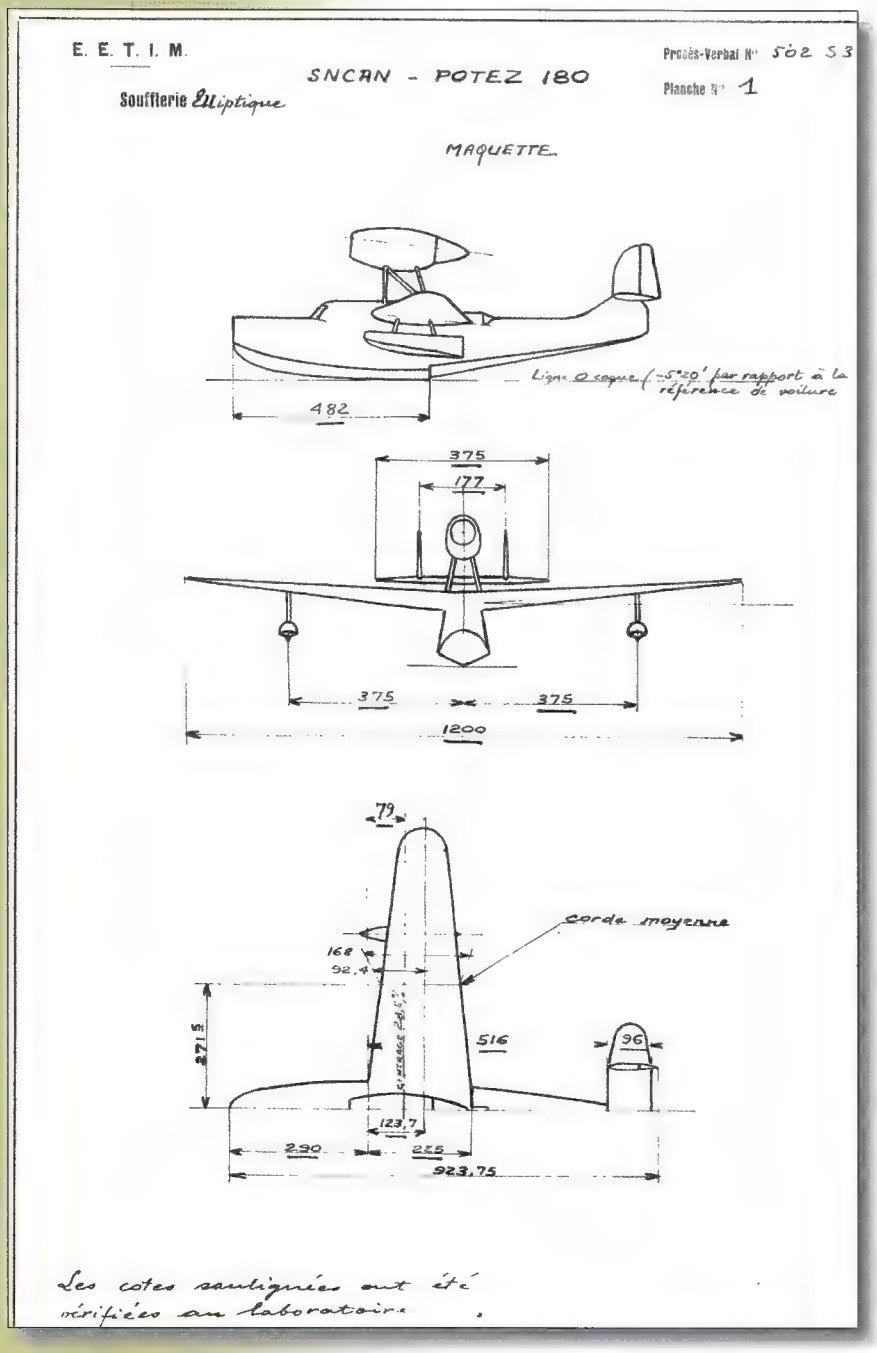
Wind tunnel model of the Potez 180 which did not proceed beyond the project stage as a coastal observation or conversion trainer flying boat.

History

The first aerodynamic tests were made on a powered model of the Potez-SNCAN 180 'New Version' in the elliptic wind tunnel at Issy-les-Moulineaux on 2 January 1940, these continuing into February.

Meanwhile, the *Aéronautique Navale* Chief of Services, *Contre-Amiral* Lartigue, ordered a series of 30 Potez-SNCAN 180s from the Air Ministry on 20 January, these aircraft being intended to *'serve as a bridge while waiting for deliveries of Loire 130 and Breguet 790 observation aircraft to reach their planned delivery levels'*. The Potez-SNCAN 180 was considered to be an excellent compromise in view of delays in delivery of the other aircraft since, in the view of the Navy: *'it was a wooden aircraft which was easy to manufacture and could be made without need for a prototype'*.

As the order could not be met quickly, it was finally cancelled during March. But the Navy continued to be interested in the project *'because of its simple construction, leading to considerable economies in terms of manpower and materials'* and *Contre Amiral* Lartigue reversed his decision to entirely abandon the project, passing a firm order for two prototypes on 3 April 1940. He wanted production of the flying boat to re-start in earnest to replace the CAMS 37 in flying schools and training units.



Original drawn of wind tunnel model of the SNCAN-Potez 180, tested at Issy-Les-Moulineaux wind tunnel.

The collapse finally put an end to this programme and the Potez-SNCAN 180 remained for ever a 'paper flying boat'.

Incidentally, it was the final seaplane project of Potez-SNCAN, formerly CAMS, and its type number is the last known to be attributed by this celebrated flying boat manufacturer.

***Aéronautique Navale* and Air Ministry Contracts:**

D.M 151 EMG/Aéro/M of 20/01/40. Navy order for 30 aircraft. Cancelled.

D. M of 03/04/40. Navy order for two prototypes. Not fulfilled.

Manufactured: None (project only)

In *Aéronautique Navale* Service: None

General Characteristics:

(A46 programme version)

Single engine wooden hulled monoplane flying boat.

Engine: 1 x 720 hp Hispano-Suiza 12Ycrs

Length: 12.38 m (40.61 ft)

Span: 16 m (52.49 ft)

Height: 4.26 m (13.97 ft)

Wing Area: 34 m² (366 sq ft)

Empty Weight: 1,973 kg (4350 lb)

Laden Weight: 3,532 kg (7786 lb)

Maximum Speed: 280 km/h (174 mph) at sea level

Crew: Four

Defensive Armament: 3 x 7.5 mm Darne machine guns (observation version)

Offensive Armament: 2 x 75 kg (165 lb) G2 bombs

Schreck FBA 17

The FBA 17 could be considered as the emblematic flying boat of French Naval aviation during the pre-war period by its longevity in production from 1924 to 1940, the large number of almost 300 manufactured and its widespread use throughout naval units where it became the 'standard mount' of student pilots. Four sub-types of the FBA 17 served in the French Navy as 'catapultable single-seater, catapultable two-place and two seat amphibian' as well as the two-seat HE.2 training version which was the most widely used.

Technical Programme Origin

The Schreck-FBA company, whose factory was at Argenteuil on the banks of the Seine, was founded in 1912 and exhibited its first flying boat at the *Salon de l'Aéronautique* in the following year. During the First World War, it became an appointed supplier to French naval aviation to the extent that, by the end of the conflict, it had delivered 838 aircraft in a power range of 110 to 200 hp, representing more than one-third of all seaplanes taken on charge by the Navy between 1914 and 1918.

On 28 July 1922, the Admiralty published a technical requirement calling for four new types of training aircraft. These specifications were the basis of the initial design by the Schreck design office for the future FBA 17 *Ecole* (Trainer). On 27 March 1923, the Navy issued Note 796-AERO-2, succinctly describing it as '*a two-seat training flying boat with dual controls*'.

It was to have three hours endurance, ability to reach its operating altitude of 2,000 meters in 25 minutes, a maximum speed of 150 km/h and a minimum of 80 km/h. Sometimes designated ET.2 in the Navy's nomenclature (for *Hydravion Ecole de Transformation biplace* – or two-seat seaplane conversion trainer), this seaplane category was finally categorized as HE.2 signifying '*Hydravion d'Ecole biplace*' (Two-seat Training Seaplane).

FBA 17 HE.2 N° 22 serving with the first unit to be equipped with the type (2R1 at Brest).

A fine example showing the famous 'Indian head' marking of the CEPA, Saint-Raphaël, on this FBA 17 HE.2 (October 1931).

The closest competitor to the FBA 17 HE.2 was the CAMS 30 which started out with the same engine, a 140 hp Hispano-Suiza. During the fourth quarter of 1922, two other HE.2 seaplanes were in contest for this category, both equipped with the 130 hp Clerget 9Bb engine; these were the Romano floatplane, then under test with the CEPA at Saint-Raphaël and a Besson triplane flying boat, neither of which entered series production.

History

On 8 November 1922, the Ministry of the Navy informed the State Under-Secretary for Aeronautics and Air Transport that it wished to order an initial lot of FBA 17s powered by the 140 hp Hispano-Suiza engine in 1923. Even so, at that date, the technical study of the prototype was not yet quite finished and discussions with the manufacturer on the final details of the contract had not yet been completed. The Navy was obviously in urgent need of these training flying boats.

The prototype HE.2 made its maiden flight at Argenteuil in May 1923, piloted by Emile Paumier who occupied the dual functions of Technical Director and test pilot with the company. He then made the first demonstration flight of the prototype at the CEPA, Saint-Raphaël, on 25 June. Right away, the aircraft was judged to '*have excellent marine qualities and to be highly manoeuvrable*'. However, its airscrew was poorly adapted and had to be changed.

The absence of access hatches was also noted, preventing greasing of the flying controls and making them harder to operate with the passage of time: removing the canvas surface covering was the only option in countering this problem!

Between 25 August and 5 September 1923, the prototype, now designated HT.2 and equipped with a 180 hp power plant, participated along with ten other competing seaplanes in the '*Course-Croisière de la Méditerranée*' which could be interpreted as a regularity trial with a time constraint. This involved a double crossing from Saint-Raphaël to Bizerta, returning to Berre. Its pilot, Jean-Fernand Laporte, won handsomely.

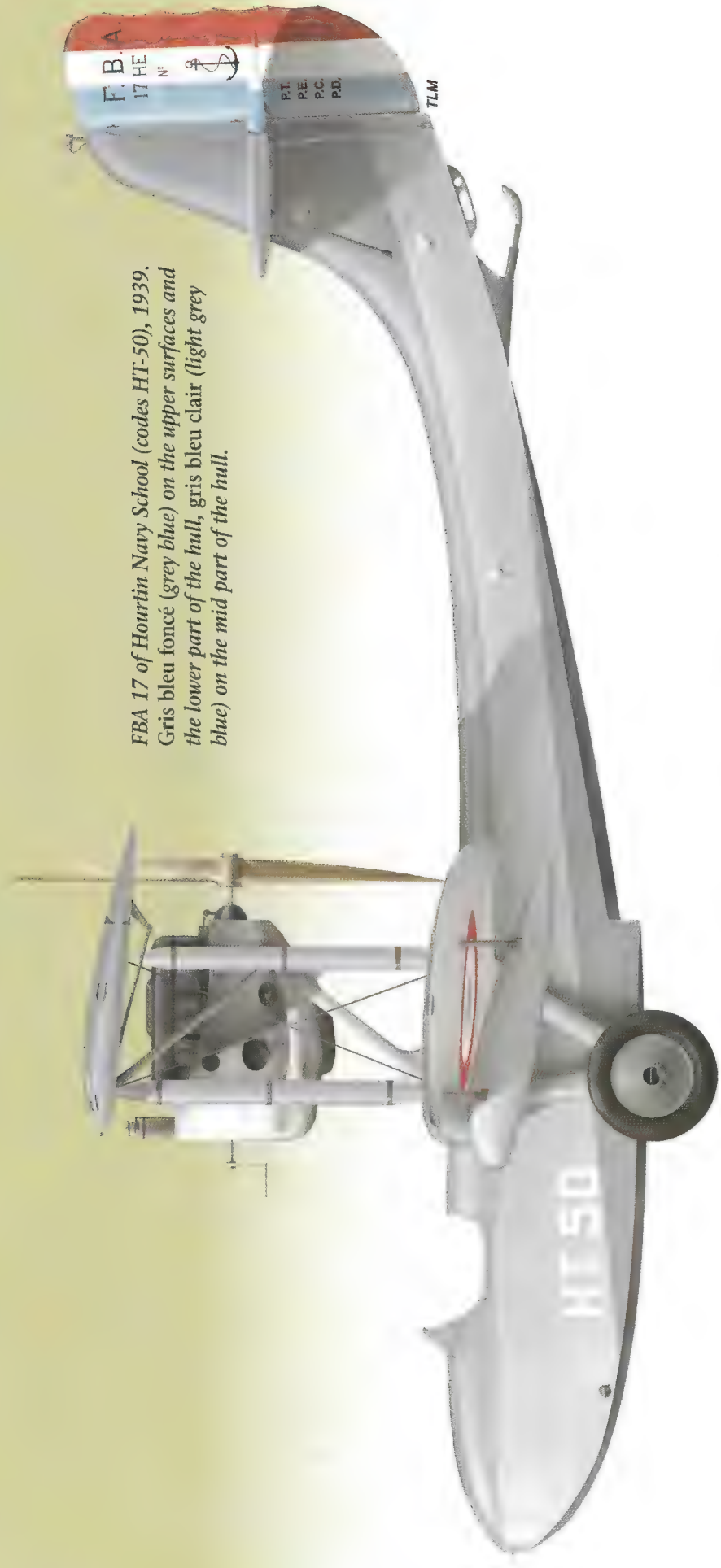
On 30 November, the same pilot established a world record in this category, without load, reaching a height of 5,535 meters flying over Argenteuil, followed on 19 March 1924 by another world record carrying a load of 250 kg to 3,760 m. The FBA 17 thus established its place as a capable aircraft, its performance already foreshadowing its exceptionally long life.

Meanwhile, its competitor, the CAMS 30E, had already been adopted as a trainer with an order for 20 aircraft. However, it was not to enjoy the same success as the FBA 17; the twelve aircraft of this type, already in service with the flying school at Berre in 1924, were prematurely withdrawn in the same year due to design faults shown up by two fatal accidents, being replaced by the first delivery of eighteen FBA 17 HE.2s.

Jean-Fernand Laporte took up the amphibian HMT.2 (*Hydravion Mixte de Transformation biplace*) on its first flight at Argenteuil on 2 February 1923. Powered by a 180 hp engine, this

FBA 17 HE.2, coded BZ.3, of the training section at Bizerta-Karouba. Gris bleu foncé *(grey blue) on the upper surfaces and the lower part of the hull,* gris bleu clair *(light grey blue) on the mid part of the hull.*

An FBA 17 serving with the training section at Bizerta-Karouba (code BZ).



FBA 17 of Hourtin Navy School (codes HT-50), 1939. Gris bleu foncé (grey blue) on the upper surfaces and the lower part of the hull, gris bleu clair *(light grey blue) on the mid part of the hull.*

derivative of the HT.2, which took part in the 1923 *Course-Croisière*, continued its tests as a land-plane version at Villacoublay in March. By the end of the year, it had already completed testing at Saint-Raphaël. It was fitted with a retractable undercarriage and a tail skid which increased its weight by 50 kg above the initial version. However, the clearance of its keel was considered too low when running on the ground and the absence of shock absorbers made it uncomfortable for the crew.

Even though conversion from the amphibian to flying boat version took only twenty minutes, the undercarriage operation system proved awkward. Twenty of the FBA 17 HMT.2 version were manufactured, these serving as liaison aircraft since the Navy did not give it a great priority, as indicated by an internal note which stated that it was '*an excellent aircraft for tourism, but without any military value. In service with Navy in its seaplane training schools, its seaworthiness leaves something to be desired due to its configuration*'.

Fifteen of the HE.2 series version were ordered as from 1925. At the same time, 15 CAMS 46 Et2 (two-seat conversion trainers) were also ordered that year, this being a successor to the type 30E. But this other product of the CAMS factory had no more success than the 30E and was not capable of matching up to the tireless FBA 17.

By 1 January 1926, 17 FBA 17 Type HT.2s were already in service, including the prototype. The first unit to operate the FBA 17 was 2R1 (1st Flight of the 2nd Maritime Arrondissement) at Lanvéoc-Poulmic before the unit was re-designated 2S1 ('S' for *Surveillance* (Observation)) in March 1928.

The first known fatal accident involving the type occurred on 19 June 1926 when FBA 17 HE.2 N° 31, flown by reserve *Q.M.* Boileau, hit the mast of the American torpedo boat *Lanson* while taking off at Cherbourg.

At Brest, a unique experience took place on 29 September 1926 when a pilotless FBA 17 HE.2, powered by a 150 hp engine, was launched from land by means of a Penhoët steam catapult, a first in France. This aircraft, coming from the stock at Berre, had been sacrificed for test purposes but it touched down without any problem after its launching. Its engine had been provided

Note the fine insignia of the 'Flying personnel school' on this FBA 17 HE.2 coded H-75 based at Hourtin (Gironde).

with only enough fuel for ten seconds flight before it ran dry. However, when the second test took place on 20 October, the aircraft broke in half when it hit the water.

On 22 October, it was *L.V.* Louis Demougeot's turn to be catapulted in a single-seat FBA 17 HL.1 powered by a 180 hp engine. A rubber cord prevented the control wheel from being forced rearwards by inertial force and the seat was padded with horse-hair and rubber. This was the first catapult launch of a piloted aircraft in France and it took place without incident or damage to the aircraft. These successful tests led the French Navy to order a dozen similar catapults of from 1,600 to 3,000 kg capacity to equip cruisers then under construction. In April 1927, this FBA 17 HL.1 was taken on board the cruiser *Primauguet* with the same pilot for a world demonstration tour with catapult launchings, returning eight months later without incident. Twenty examples of a two-seat version of this flying boat, the HL.2, were also built and they served on 7,000 tonne cruisers up until the mid-1930s.

In August 1927, a version of the FBA 17 with a metal hull and floats was tested at the CEPA. However, its hull, too lightly built, broke during testing and this version was not proceeded with, series production continuing with wooden hulls.

Demand for this small flying boat, including for export, was so high that in March 1931, when the Government ordered a further 18 type FBA 17 HE.2[1], production had already reached 202 aircraft in barely eight years.

At the time, most other aircraft manufacturers were not in such a fortunate position, despite the relatively low price of the FBA 17 (127,000 Francs) compared with the CAMS 37 in a similar category costing 300,000 Francs. On 1 May 1931, when French Naval aviation accounted for

1. The letter 'a' appeared in lower case in the designation 'FBA 17 a HE.2' was not a misprint since it figured in the clauses of contract N° 194/1 and on the rudders of aircraft delivered, though painted in capital letter size. By simple deduction, it could signify 'Adapted' or 'Adaptation' since the main modification concerning these eighteen examples, to be delivered between July 1931 and April 1932, consisted in the text as 'the adaptation of a cover over the cockpit allowing blind flying'. But this is just one hypothesis among others.

An amphibious version of the FBA 17 HE.2 (Type HMT.2) with retractable undercarriage. Note that the keel aft of the step is very close to the ground, a criticism made by the sailors. This type of aircraft could be considered as equivalent to the CAMS 37 Lia.

A fine shot of FBA 17 HE.2 serving with the training section at the Berre seaplane training base (code BE).

An FBA 17 HE.2 with a 180 hp Hispano-Suiza engine seen here at Berre in May 1929. The letter 'M' was characteristic of the Berre base.

around 500 aircraft, no less than 89 FBA 17s were in service, undergoing repairs or in transit. The Hourtin flying school was the most important user with 30 aircraft in service.

The first of twenty FBA 17 HE.2s (N°s 253 to 272) ordered under contract N° 800/8 passed in 1938 came off the production line in July 1939, the last being delivered on 29 March 1940 to Hourtin naval air base, where most of the HBA 17 HE.2s were gathered. A final wartime order for 30 new FBA 17 HE.2s (N°s 273 to 302), destined for the flying school at Hourtin and fitted with 180 hp Hispano-Suiza 8 Ad engines, was placed on 28 November 1939 (contract N° 2994/9). The recipient of the order was the obscure 'Etablissements Heerburger' located at Argenteuil. This little-known firm had taken over the assets of the *Société des Avions Bernard* (SAB), which had itself taken over the aircraft manufacturing activities of the defunct Schreck-FBA company. This final order for the FBA 17 HE.2 was increased to 50 and then to 90 aircraft, 36 of which were to be delivered between January and June 1940, but due to industrial problems encountered during this difficult period only six were delivered before the armistice (N°s 273 to 278).

Archive records of the Naval Air Base at Hourtin and the SNCAO factory at Saint-Nazaire, contain traces of deliveries by reception pilots of the EGAN-Orly of HE.2s N°s 259 and 260 in October 1939, N°s 262, 264, 265 and 266 in January 1940 followed in February by N°s 267, 268, 269, 270, 271 and 271 and finally N°s 273, 274, 275 and 278 in the following May. The last two aircraft mentioned bore the highest known serial numbers of all FBA 17s manufactured and were taken on charge at Hourtin on 29 May 1940, in the middle of the debacle.

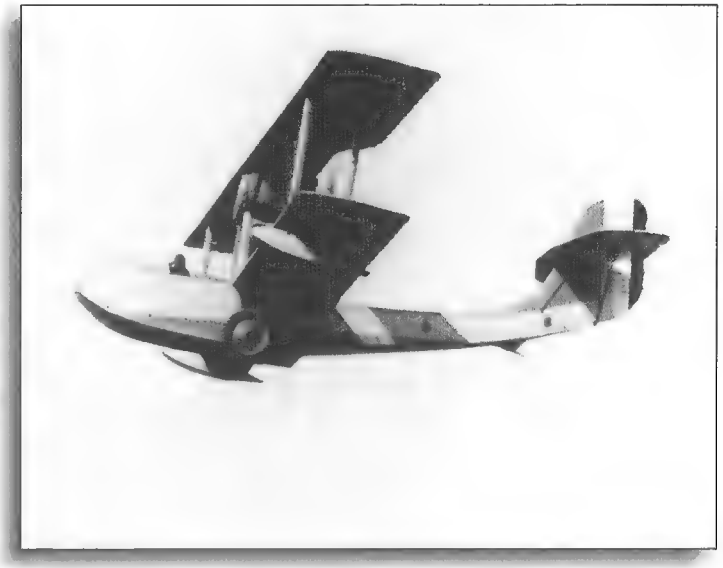
When the Admiralty carried out a census ordered by the German authorities on 17 July 1940, ten FBA 17s were listed as being available in metropolitan France, French West Africa and North Africa.

At the end of August 1940, the Italian control commission authorised the preservation of five FBA 17 HE.2s for training and hack duties with four more to be kept in reserve.

FBA 17 coded BR 33 of the training section at Brest. Note the presence of the mysterious letter 'A' on the rudder before the type HE.2 (see text) and the absence of a series number.

A fine shot of FBA 17 HE.2 serving with the training section at the Berre seaplane training base (code BE).

FBA 17 Left (Hourtin navy School) with some FBA 17s, before the war.



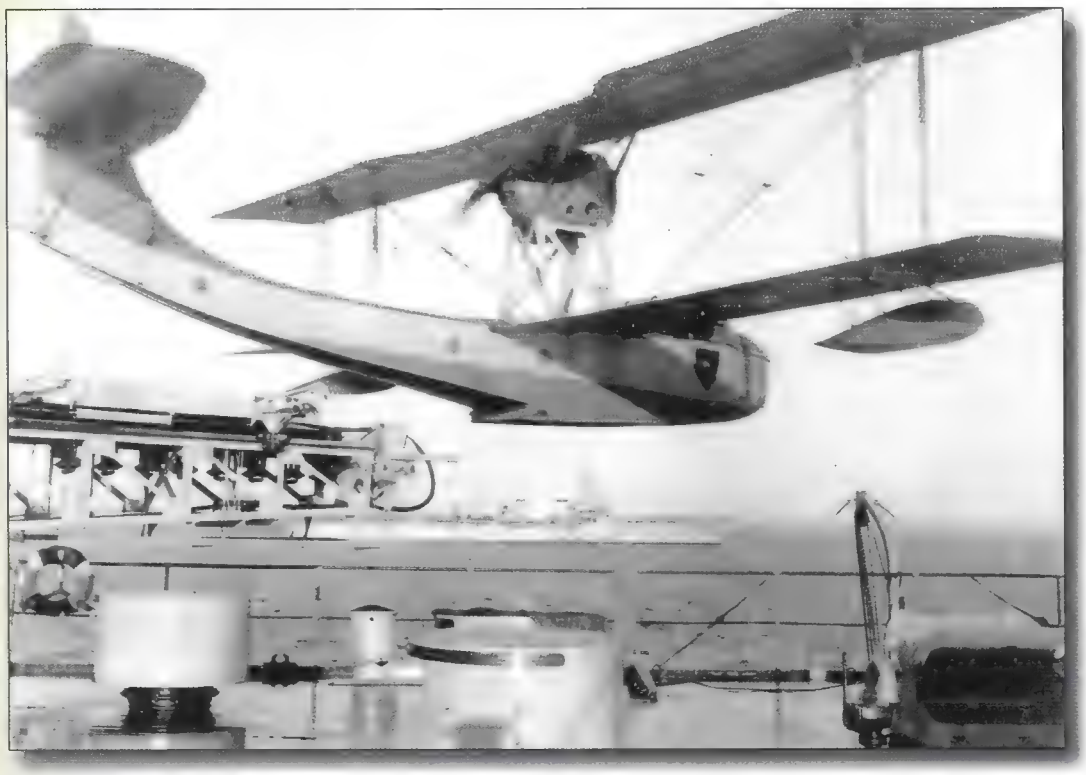
FBA 17 prototype during early test flight at CEPA.

FBA 17 HE.2, coded HT.58, of the pilot training school at Hourtin. Gris bleu foncé *(grey blue) on the upper surfaces and the lower part of the hull,* gris bleu clair *(light grey blue) on the mid part of the hull.*

A fine view of FBA 17 HE.2 N° 228, code HT.57, touching down on the lake at Hourtin. Note that, unusually, only one pilot is on board.

A further census at the beginning of September indicated the presence of eleven FBA 17 HE.2s at Berre, of which five (N°s 174, 179, 196, 209 and 233) were reserved for the Saint-Raphaël base and six stored (N°s 130, 180, 208, 234, 238 and 248). In total, it is estimated that close to fifty FBA 17s were seized by German troops when fighting ended at the end of June, most of these trainers being based at Hourtin where the parc of this type was the largest and where many aircraft had been abandoned with the collapse of France.

None of these aircraft were of any military value and were destroyed by the occupying power, as the *Luftwaffe* could find no use for them, apart from in the first few days after the French defeat when a few of these antiquated biplanes, hastily painted in German colours, were briefly flight tested up and down the coasts of Aquitaine by some foolhardy enemy pilots making pleasure trips.



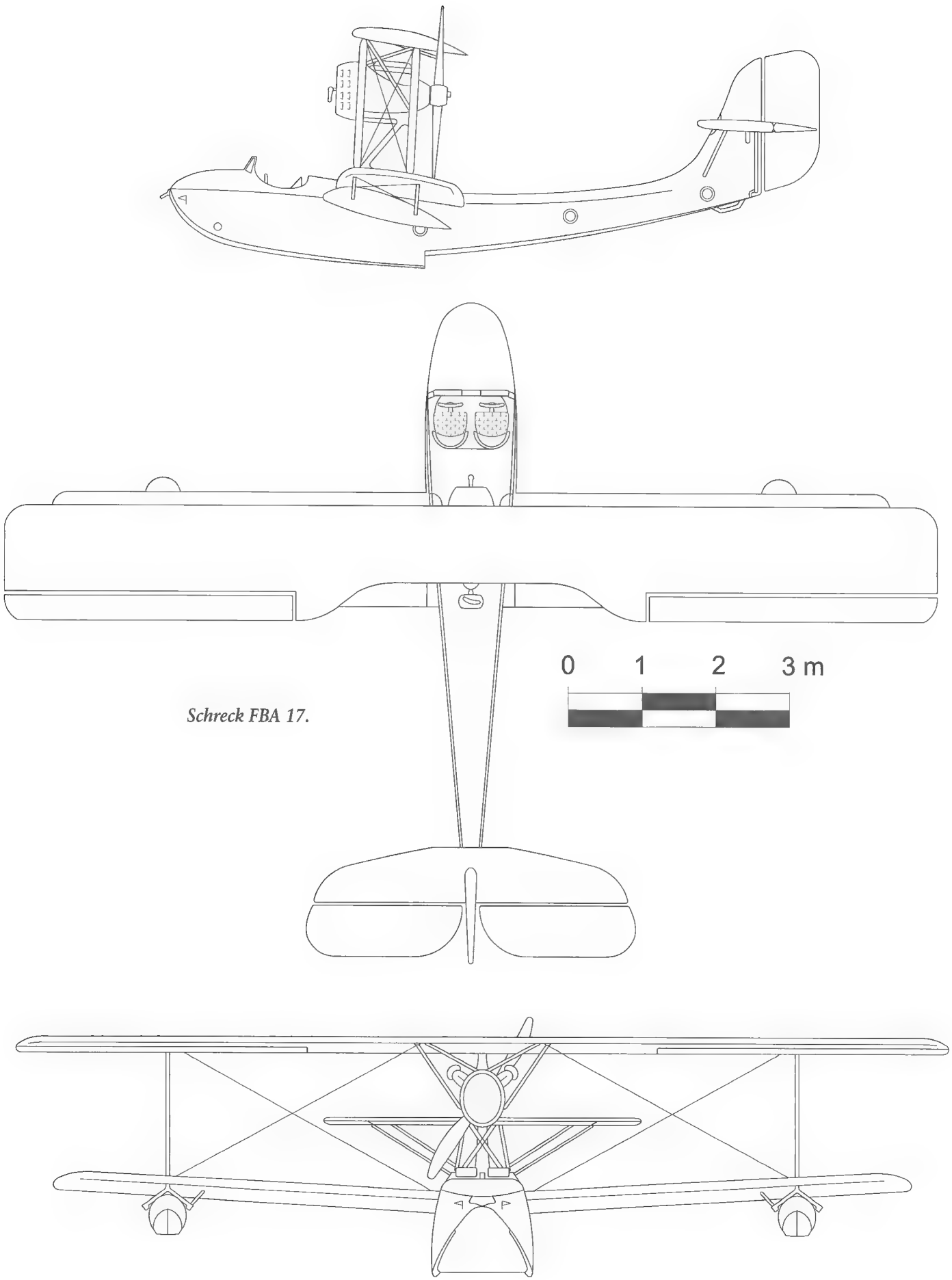
FBA 17 type H.L.2 (biplace) being launched by catapult. Note the 'X' braced struts supporting the engine, a feature which distinguished this version from the HE.2 type. This modification was made to strengthen the airframe during catapult launching.

Confirmed Air Ministry Contracts (partial list)
N° 142/4 of 30/04/24 (order for one HMT.2)
N° 854 of 15/12/26 (order for six HE.2 with 150 hp engine)
N° 358/8 of 04/29 (order for 38 HE.2)
N° 194/1 of 23/03/31 (order for '18 HE.2' N°s 185 to 202)
N° 1243/5 of 12/02/36 (order for 12 FBA 17)
LCVM N° 800/8 of 14/02/38 (order for 20 FBA 17 HE.2, N°s 253 to 272).
Order D.T.I. N° 17470 of 28/11/39 (order for 30 FBA 17 HE.2, N°s 273 to 302) – only partly fulfilled.
N° 2994/9 of 1939 (order for 30 FBA 17 HE.2 N°s 273 to 302 partially fulfilled, then 50 FBA 17 HE.2 unfulfilled
Allocation by Type of FBA 17: 278 HE.2, 2 HL.1, 20 HL.2, 21 HMT.2
In *Aéronatique Navale* Service: a figure of well below 300 for the HE.2 version[2], two examples of the HL.1, twenty HL.2 and twenty-one HMT.2 (1924 – 1940).
Units: Most of the training and general service units at Naval Air Bases *(BAN)* during the period. Flight 2R1, Donnaï flight, Gnome & Rhône school at Saint-Chamas.
On Naval Vessels: Colonial sloops *Amiral Charner*, *Rigault de Genouilly*, Aircraft carrier *Béarn*, Cruisers *Primauguet*, *Lamotte-Picquet*, *Duguay-Trouin*, *Strasbourg*, *Tourville.*
General Characteristics: (Training version)
Single engine biplane flying boat with wooden hull (ash and poplar).
Engine: 180 hp Hispano-Suiza type 41
Propeller: Two-bladed 'Lumière' series 185-67
Span: 12.87 m (42.22 ft) [lower wing – 11.75 m (38.54 ft)]
Length: 8.94 m (29.33 ft)
Height: 3.2 m (10.49 ft)
Wing Area: 26.5 m² (285.25 sq ft)
Empty Weight: 930 kg (2050 lb)
Laden Weight: 1,200 kg (2645 lb)
Maximum Speed 160 km/h (99 mph)
Touch-down Speed: 82 km/h (51 mph)
Climb Time: 10 min [1,000 (3281 ft)/2,000 m (6562 ft)], 33 min [4,000 m (13,123 ft)]
Practical Ceiling: 4,500 m (14,764 ft) [1h15min]
Take-off Time: 11 sec
Range: 400 km (248 miles) [minimum speed] 320 km (199 miles) [maximum speed]
Crew: Two (instructor to port, student pilot to starboard)
Defensive and Offensive Armament: None

2. The total of 278 aircraft manufactured cannot be considered as equivalent to the number of FBA 17s effectively taken on charge by the Navy, given the difference between production figures and the number of aircraft attested in units.

An FBA 17 HE.2 from the Hourtin base, 'borrowed' by a German pilot for a pleasure flight along the Aquitaine coast and posing here on the beach at Royan on the Garonne estuary north of Hourtin at the end of June or beginning of July 1940. Note the provisional German markings, especially the Red Cross indicating that the aircraft was in the hands of an air-sea rescue unit (Seenotstaffel).

Photo of German origin showing two FBA 17s of training flight (Lanveoc-Poulmic 1940). BR 30 bears German markings. (Bartłomiej Belcarz coll.)



Schreck FBA 17.

Schreck FBA 293 / 294

History

The Schreck FBA 293 and 294 did not correspond to any specific naval technical programme. They were two models of liaison and training flying boat extrapolated from the '*Type 290 de tourism*', itself a closed cabin development of the famous FBA 17 training aircraft.

The prototype 290 HM4 (four-place Mixed-amphibian Seaplane) was powered by a 300 hp air-cooled Lorraine *Algol* engine; it was exhibited for the first time at the *XIIème Salon de l'Aéronautique* held in the Grand Palais in November-December 1930. It was registered F-ALIM and performed brilliantly in tests flown by the Schreck factory pilot Louis Lescure. It was particularly noted for its great stability in flight. It then made a demonstration tour of Scandinavia and the Baltic countries in May-June 1931, being flown by Yves Lantz[1], accompanied by two mechanics and a civilian administrator. During this period, it was also temporarily attached as a liaison aircraft at the Villacoublay flight testing centre and was also tested by officers of the Hourtin naval aviation base. The naval officers gave the aircraft a very favourable reception to the point that it was decided to extrapolate a naval version from the civil 290, to serve as a liaison aircraft for the General Staff. At the time, the Navy only had available a few CAMS 37 *Lia*. In addition, the FBA 17 was considered sufficiently well tried that there would be no risk in ordering a closed cabin version without undergoing the usual tests.

A manufacturing contract for six militarised 290s was placed but, for reasons unknown at present, it was decided to equip them with two different types of engine of the same power (300 hp), both of these being air-cooled[2]. Thus, the first three aircraft, designated FBA 294 (series numbers

1. Future receiving pilot with the Breguet company where he later test flew the Breguet-Short *Calcutta* and Breguet *Bizerte* in particular. By November 1930, he had already accumulated 2,600 flying hours as a test pilot.
2. This differentiation could arise from the intention to test two different types of engine before choosing a definitive model to equip a future series order which, in the end, did not materialise. This approach had already been used in the case of the first series of CAMS 55.

FBA 293, series N° 6, equipped with a 300 hp Lorraine engine, seen here during a visit to the Netherlands before the war.

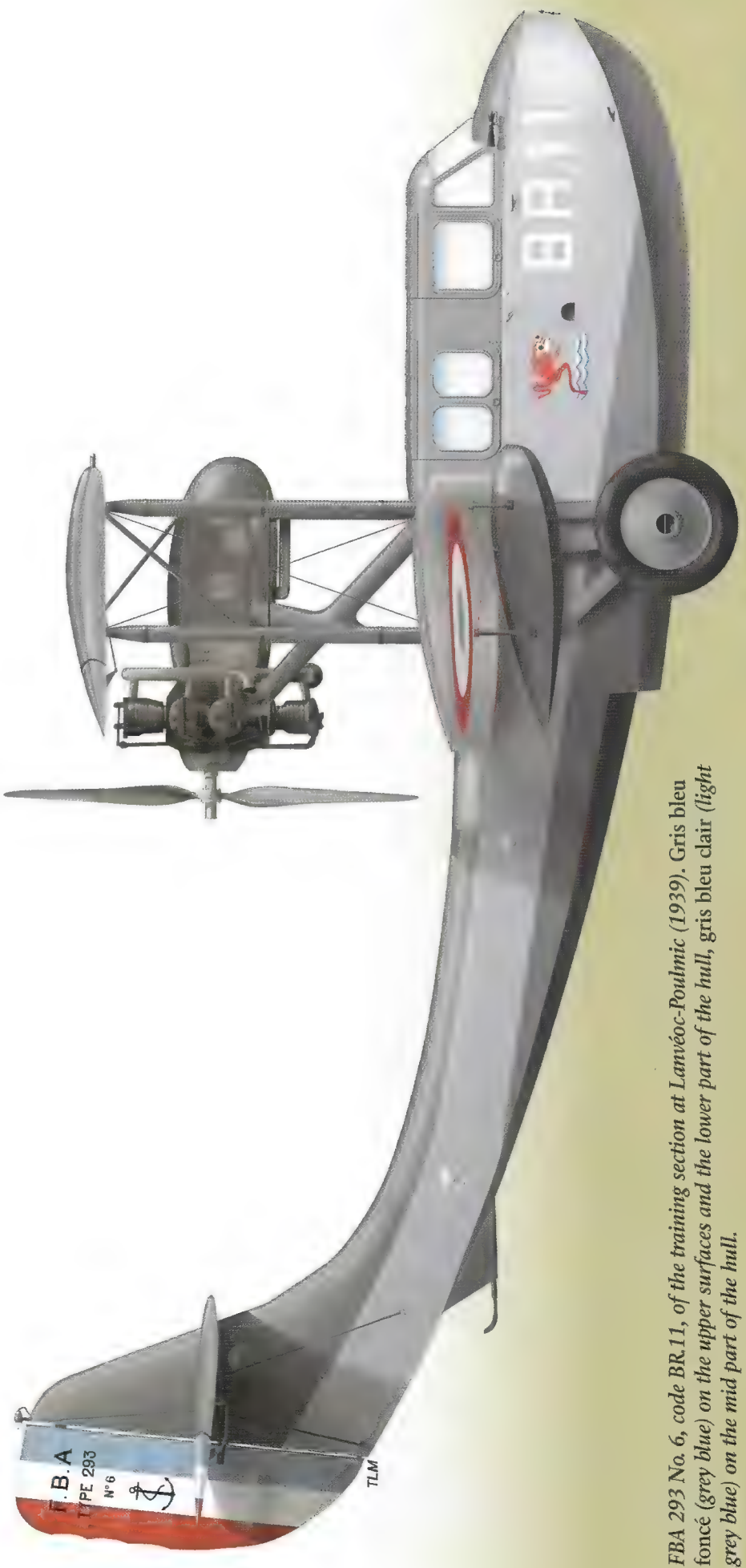
1 to 3), were fitted with the Gnome & Rhône *Titan-Major*. The three others, designated FBA 293 and numbered 4 to 6 were powered by a Lorraine *Algol*, identical to the prototype 290[3]. As from 1934, the six aircraft were placed in service at the Naval Aviation General Depot (EGAM) at Orly and at the naval aviation centers at Brest and Rochefort.

Even though these aircraft were occupied in carrying out General Staff liaison missions of a secondary nature, they were nevertheless involved in two fatal accidents. The first, which was highly spectacular, occurred on the afternoon of 3 April 1934 in the commune of Ablon, then part of the Seine & Oise department. On approach for landing at Orly, some three kilometres distant, FBA 294 N° 1 appeared to have engine difficulties and its pilot made a forced descent onto the Seine, capsizing as soon as its undercarriage hit the water. Three persons were on board including *Contre-Amiral* Léon Martin of the Naval General Staff, who died by drowning as he was trapped in the wreckage.

Happily, the four remaining aircraft of this small series still in service with the Navy suffered no further notable incidents in 1935. In March of the same year, a crew comprising Latécoère company pilot Pierre Crespy (renowned pilot of LATE 521 *L.V. Paris*) and *L.V.* Bonnot of EGAM-Orly took passengers up on their first flights with FBA 293, coded OR-14, between Biscarrosse and Toulouse. Flying the same aircraft, *L.V.* Bonnot put it down on the lake at Lourdes, flying from Biscarrosse on 22 and 23 April.

On 2 April 1936, an FBA 293 suffered engine failure while taking off from the airfield at Rochefort-Soubise. In the ensuing forced landing, the aircraft overturned and *Quatre-maître*

3. These two models could be distinguished externally by the position of the engine exhaust collector ring, placed in front of the engine on the type 293 and behind on the 294.

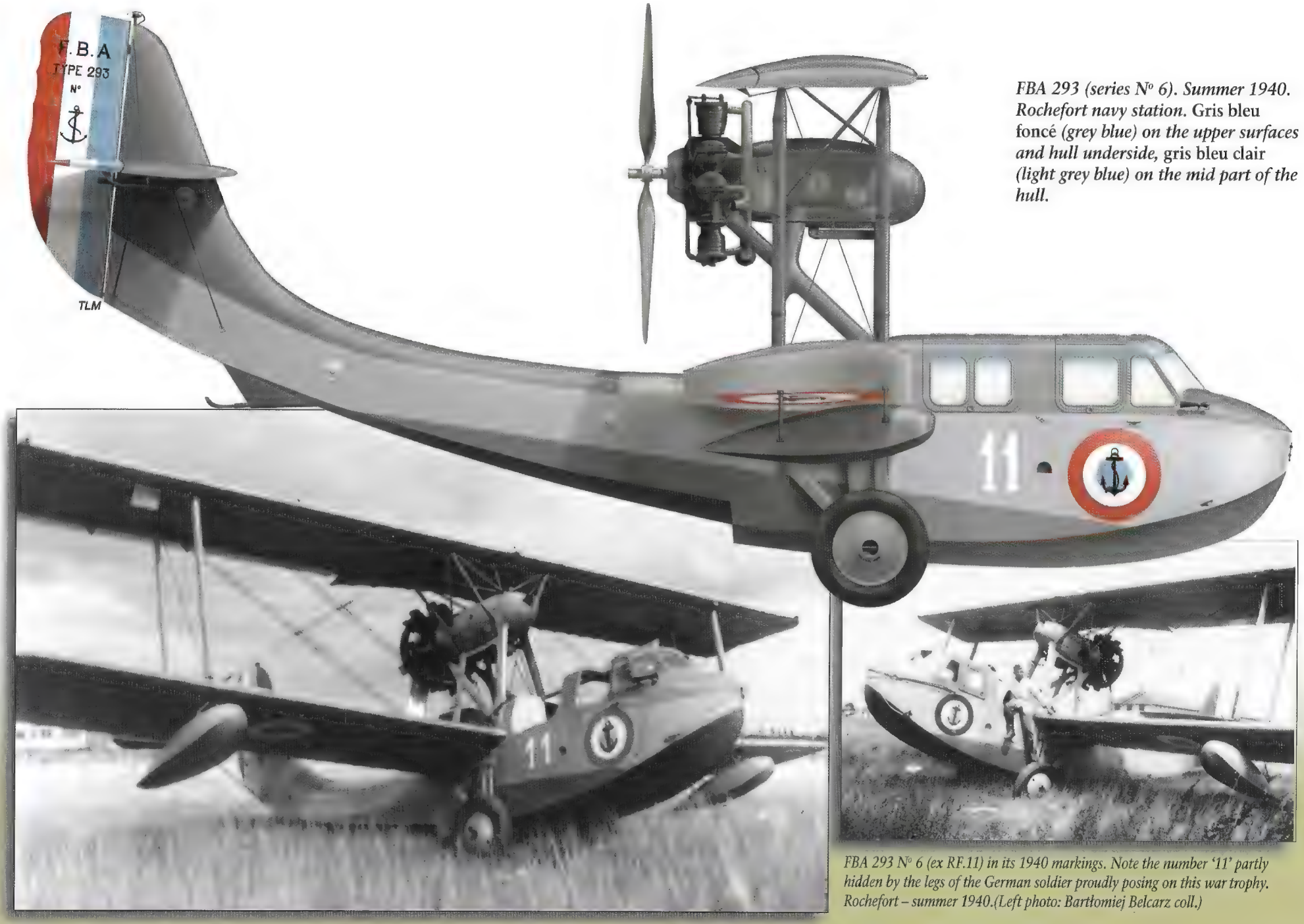


FBA 293 No. 6, code BR.11, of the training section at Lanvéoc-Poulmic (1939). Gris bleu foncé (grey blue) on the upper surfaces and the lower part of the hull, gris bleu clair (light grey blue) on the mid part of the hull.

Wreckage of FBA 294, series N° 1, which crashed at Ablon (Seine & Oise) on 3 April 1934. The aircraft had to be cut open by axe to extract the body of Contre-amiral *Léon Martin, the only victim of this accident.*

FBA 293 of EGAM-Orly, coded OR 14.

FBA 293 (series N° 6). Summer 1940. Rochefort navy station. Gris bleu foncé *(grey blue) on the upper surfaces and hull underside,* gris bleu clair *(light grey blue) on the mid part of the hull.*



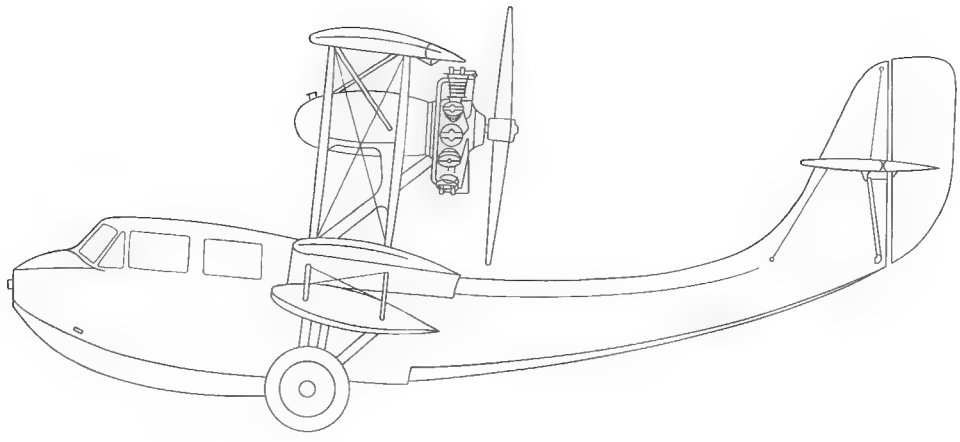
FBA 293 N° 6 (ex RF.11) in its 1940 markings. Note the number '11' partly hidden by the legs of the German soldier proudly posing on this war trophy. Rochefort – summer 1940.(Left photo: Bartłomiej Belcarz coll.)

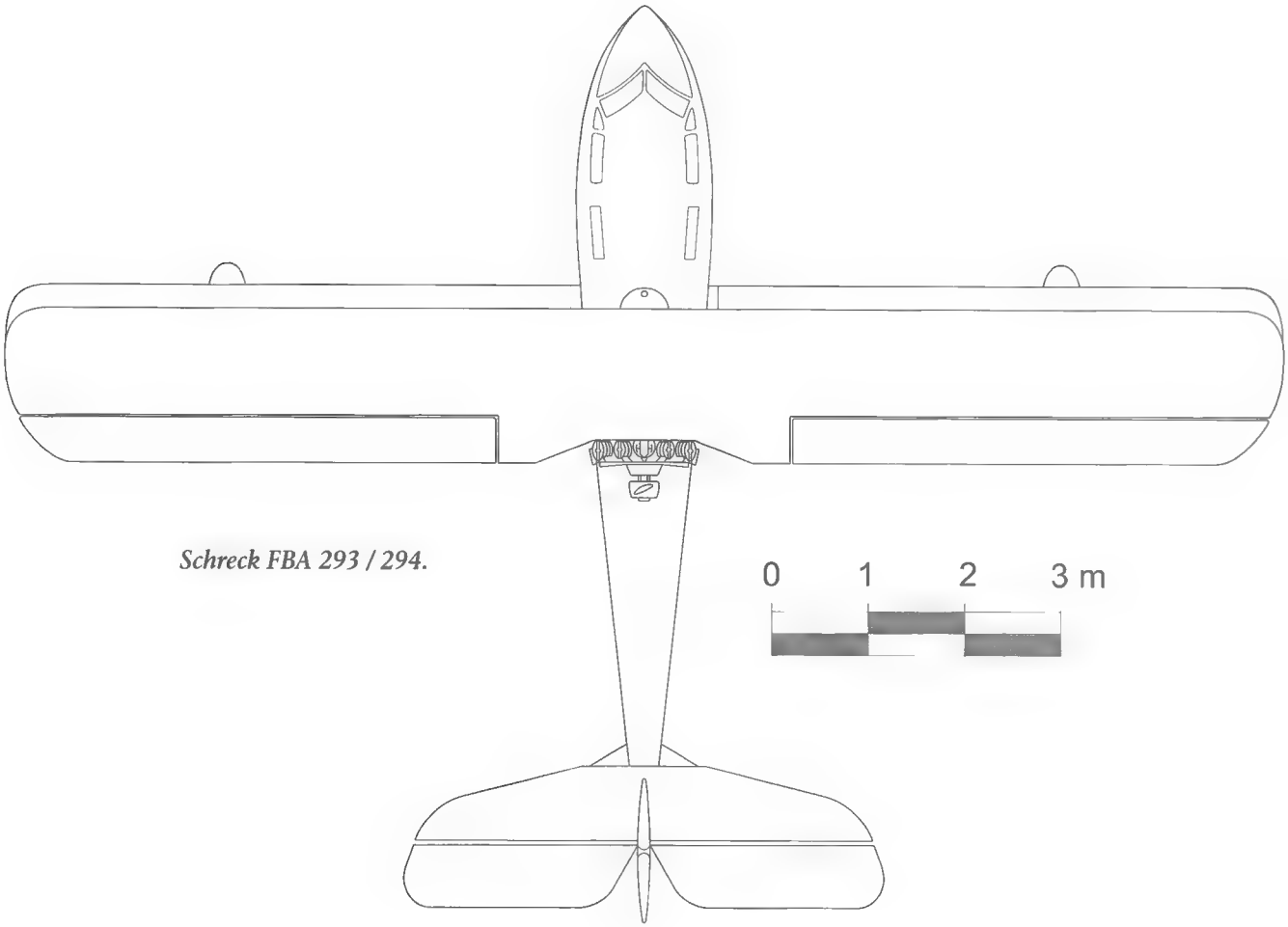
mécanicien volant Lucien Le Goaziou, who did not have his harness attached, was killed instantly. In 1936 and 1937, the only FBA 293 (code OR-14) still based at Orly, was used by C.C. Bonnot on several occasions to fly non-stop from there to points as far away as Cherbourg, Bordeaux or even Saint-Nazaire.

This shows that the aircraft adequately fulfilled its role and had sufficient range to carry out a wide variety of liaison missions. When the war began in September 1939, only two of these aircraft remained in operational service: the first (FBA 293 N° 6, coded BR.11) was with the training section at Lanvéoc-Poulmic and the second at Rochefort (FBA 294 N° 2). Neither of them played a major role in the conflict, being limited to secondary training and liaison missions. Both were abandoned in June 1940 at their respective bases, where they were found by German troops and scrapped soon afterwards.

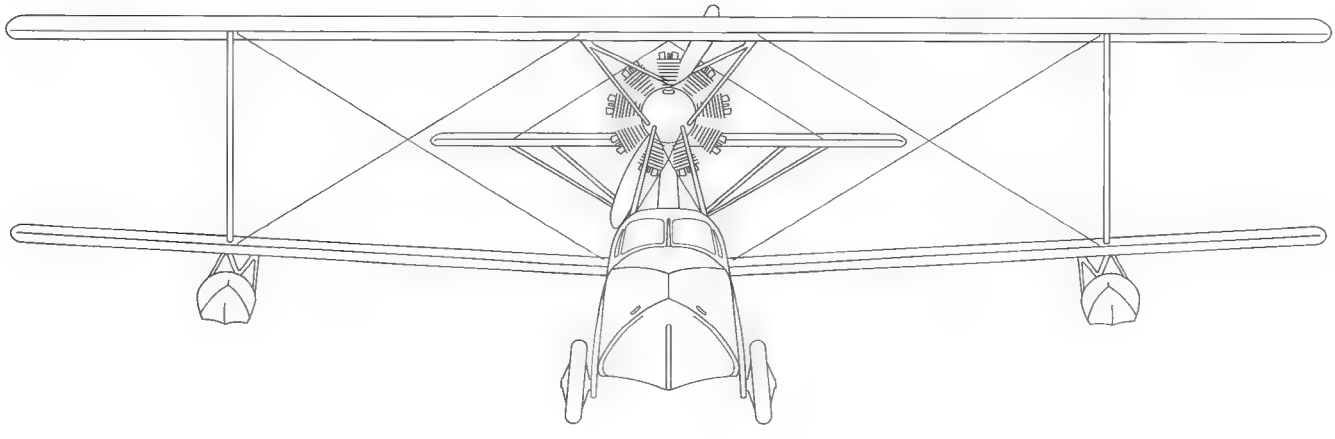
Air Ministry Contract (no technical programme)
No known reference number (order for six FBA 293/294 numbered 1 to 6).
Manufactured: Six (three FBA 294 number 1 to 3 and three FBA 293 numbered 4 to 6).
In *Aéronautique Navale* Service: Six (1934 – 1940).
Units: EGAM Orly, Training sections at Brest and Rochefort (1934 – 1940).
General Characteristics:
Single-engine biplane amphibious flying boat with floats: canvas covered wooden structure.
Engine: 1 x 300 hp Lorraine 9Na pusher (FBA 293), 1 x 300 hp Gnome & Rhône 7kb pusher (FBA 294)
Span: 13.1 m (42.97 ft)
Length: 9.48 m (31.1 ft)
Height: 4.04 m (13.25 ft)
Wing Area: 40.15 m² (432 sq ft)
Empty Weight: 1,380 kg (3,042 lb)
Laden Weight: 1,980 kg (4,365 lb)
Maximum Speed: 175 km/h (109 mph)
Endurance: 3h30min [550 km (342 miles)]
Ceiling: 4,700 m (15,420 ft)
Crew: Four (1 pilot, 3 passengers)
Armament: None

FBA 293 N° 6 at the Rochefort flying school before the war.





Schreck FBA 293 / 294.



SNCAC / NC 420

Technical Programmme Origin

The SNCAC type NC 420[1] was developed in response to Technical Programme A62, which called for '*a heavy shipboard reconnaissance seaplane of 3.4 tonnes*' (Class S.B in official *Aéronautique Navale* terminology). This requirement was dated 8 August 1938 but in fact, was developed from an earlier naval outline dating from March 1937[2]. The programme was aimed at the replacement of several types of aircraft already in service with naval units (Loire 130, Gourdou-Lesseurre GL 832 HY and Potez 452). The NC 420 was in competition with two other types of twin-engine seaplane under consideration by the CEPANA: the Breguet 792 and the Gourdou 130 HY, the latter being the only float-plane in the competition. The NC 420 was a catapultable monoplane of metal construction with a wing similar to the Farman 470. It had an unusual appearance with wings folded, accentuated by the curious form of the pilot's cockpit, offset to the left, to '*facilitate manoeuvring on the water*', in the terms of the design office[3]. At the time, this concept of a twin-engine flying boat with folding wings had no equivalent anywhere else in the world.

History

Two examples of the NC 420 were ordered by the Air Ministry on 20 January 1939 for a total price of 6,900,000 Francs, not including engines, compared to 7,280,000 Francs for the two competing Breguet 792s ordered at the same time.

The mock-up was examined three times during the year at the SNCAC factory at Billancourt before it was finally approved in July. When the war began, the Navy's interest in this type of seaplane remained intact and, in September 1939, manufacture of the Breguet 792 and NC 420 was classed as second highest priority, just after programme A46 (SE 400 and Breguet 790 coastal reconnaissance seaplanes).

In December, the Air Ministry envisaged that two prototypes would be ready by July 1940 at the latest. These were under construction at the SNCAC factory at Fourchambault, near Nevers

1. SNCAC – *Société Nationale de Constructions Aéronautiques du Centre*, took over the former Farman and Hanriot companies nationalised in 1936, bringing together factories and aerodromes located at Billancourt, Toussus-le-Noble and Bourges.
2. See Chapter 'Technical programmes and categories of *Aéronautique Navale* seaplanes'.
3. The concept of the offset cockpit was not new in France, having already been used by the CAMS design office on its Type 110).

The NC 420 at Antibes. Note the contorted form of this small twin-engine flying boat, the only one of its kind in the world at the time.

The SNCAC team in front of the NC 420 at Antibes (July 1943). Fourth from the left is Lucien Coupet, the well-known Farman Chief pilot.

in the Nièvre department. The first NC 420 had not yet been completed when the Armistice was signed in June 1940. As from then, its 'completion'[4] depended on the German authorities.

It was not until 28 July 1941 that a protocol agreement concerning '*a Franco-German programme for aircraft construction*' was signed and the question of the NC 420 slowly surfaced again. In February 1942, the State Secretariat for Aviation asked that the manufacture of 15 NC 420 be written into the fourth block of the Franco-German programme (1943 – 1944).

This level of production was justified by the French Navy to compensate for a rate of attrition of fifteen 'on-board' seaplanes embarked on naval vessels each year.

Assembly of the prototype, restarted at Fourchambault with the agreement of the occupying power, was completed in October 1942. Lucien Courbet, renowned chief pilot for the Farman company before the war, was given the task of supervising testing of the aircraft. Testing was to have been carried out at Berre but there was insufficient room there due to the presence of a large number of naval units.

Finally, the seaplane base at Antibes, which had been closed for flying since 1938 and had unused hangars available, was chosen to accommodate the NC 420 and its very small testing team of only five people. At the end of November 1942, the disassembled and engine-less NC 420 arrived by rail at Antibes and was lodged in the former Loire & Olivier hangar which had been used by the prototype LeO H47, tragically lost in an accident in May 1937[5].

The two Béarn 6D 07 engines, each developing 325 hp at ground level, only arrived at Antibes in April 1943. By mid-June, the NC 420 had been completed and its first flight scheduled for 1 July, depending on approval by the Italian authorities. The final checks before the flight programme was to begin took place at the beginning of July. These involved examining the hull for leaks and the general disposition of the aircraft in the water, checking the position of the centre of gravity with the aircraft suspended from a crane.

However, the final decision on the date for the first flight took time in coming. Unfortunately for the highly motivated but small SNCAC test team, an unforeseeable event brought the process to a halt. On 16 August 1943, Maurice Hurel, the illustrious designer of the CAMS series of flying

4. 'Completion': a term used officially by the German and French authorities for aircraft which had not been completed at the time of the Armistice and for which the occupying power had authorised continuation of production (Loire 130 and Latécoère 298 in particular).

5. See Chapter 'Lioré & Olivier LeO H-246'.

This photo shows how much the width of the NC 420 has been reduced by folding its wings.

boats, took off clandestinely from Cannes-Mandelieu airfield for Algeria with eight people, including his three sons, at the controls of the small twin-engine prototype SO 90.

Retaliation on the part of the Italians was not long in coming, since the NC 420 could also just as well try the same trick and fly across the Mediterranean to join the Allies. As a result, in September 1943, the team working on the NC 420 at Antibes was forbidden from carrying out any further activity, the aircraft being dismantled and put back into its hangar.

In December, the French authorities cancelled the contract for the NC 420 as they saw no further need for a flying boat in this category, the contract and the programme having originated more than five years earlier. Moreover, the seaplane tender *Commandant Teste*, to which series production NC 420s would have been attached, was now lying abandoned on the seabed at the Toulon arsenal after the French fleet was scuttled there in November 1942. For a time, transfer of the NC 420 by road to Amphion on the banks of Lake Léman had been considered but this course was quickly abandoned[6]. By now, the aircraft was getting in the way at Antibes where the *Kriegsmarine* wanted the hanger in which it was stored, ideally situated on the seafront.

The solution came from SNCASO which had obtained an authorisation from the occupying power to store some completed aircraft and equipment in a large, disused oil-mill located in the commune of Flayosc, west of Draguignan in the Var department. The dismantled components of the NC 420 were taken at first to Cannes-La Bocca and then moved by road to Flayosc in three trips from April to May 1944. The NC 420 was moved to Cannes at the end of 1944 and then, for a time, to Marignane.

During the summer of 1945, it continued its wanderings on the roads of France, finally ending up on the former Farman airfield at Toussus-le-Noble, which Lucien Coupet had taken over as manager.

Quite surprisingly, a contract valued at 2,600,000 Francs (around a quarter of the amount of the purchase price of the two prototypes) was signed in 1948 for putting the NC 420 back into flying condition.

But SNCAC was experiencing insurmountable financial difficulties and was wound up in June 1949. The contract was cancelled, even though the aircraft was 92% complete on 31 December 1948. Lucien Coupet was then named Director of the test flight centre at Melun Villaroche.

6. At around the same time, the use of the Amphion seaplane base had been considered for testing the huge six-engine commercial flying boats SE 200, Latécoère 631 and Potez-CAMS 161 which were at Marignane. As was the case with the NC 420, the German authorities opposed their transfer.

NC 420 (Antibes – 1943). Gris bleu foncé *(grey blue) on all surfaces.*

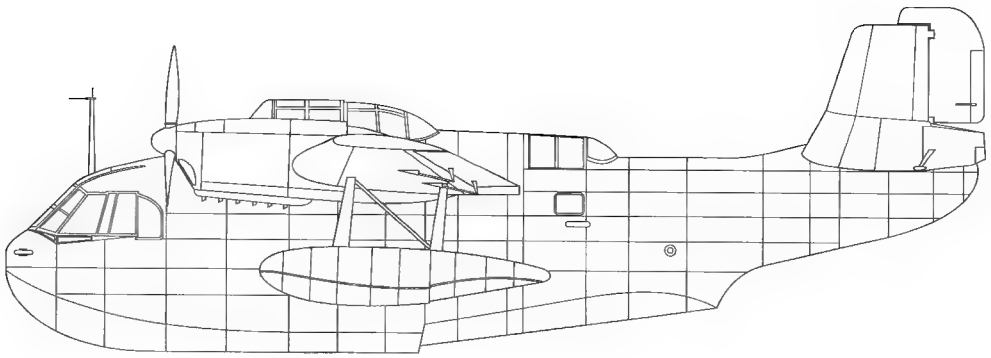
Again at Antibes, with Fort-Carré in the background, a crank handle is being used to prepare the wings for folding.

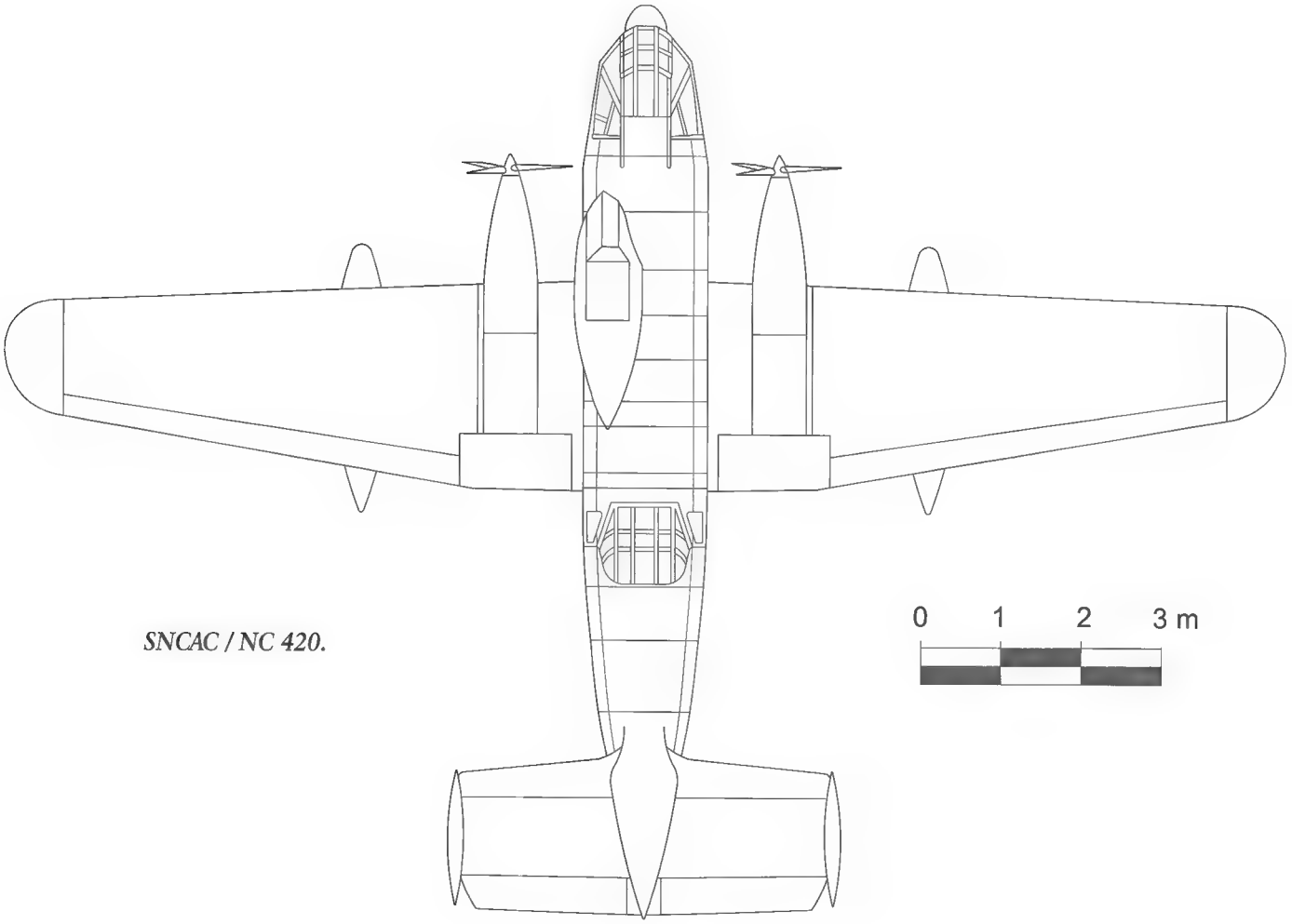
The NC 420 was forgotten by everyone and lay abandoned in the former SNCAN hangar on the southern end of Toussus-le-Noble airfield. It is said that it stayed there until 1955 in the company of two British DH Tiger Moth biplanes and several Heinkel 162 jet fighters of the defunct *Luftwaffe*. After that, all traces were lost.

Quite unusually, this flying boat, which never flew except when hanging from a crane at Antibes, covered a distance equivalent to 2,000 kilometres by road and rail between its different storage places.

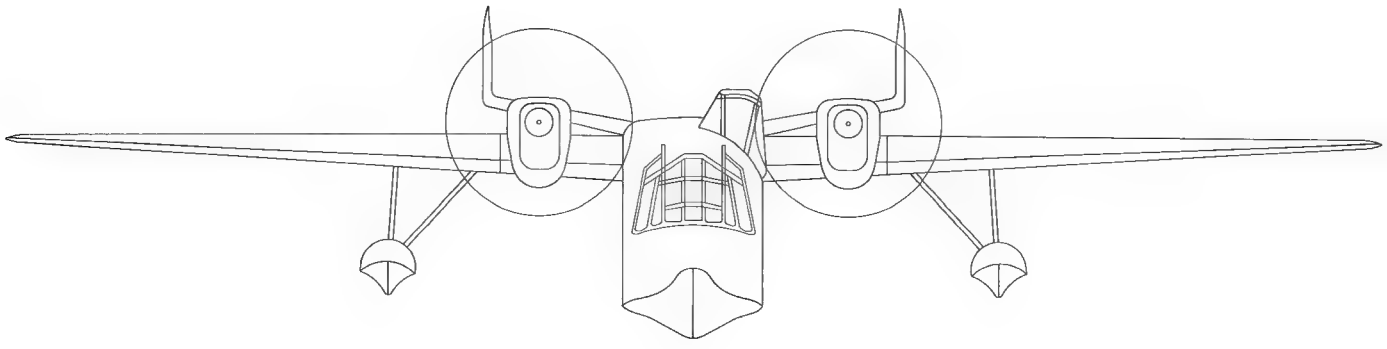
Air Ministry Contracts (A62 Technical Programme)
N° 215/9 of 20 January 1939: order for two NC 420s
N° 2168/48 (1948): for completion of prototype NC 420
Series Order: 11 February 1942 order of State Secretariat for Aviation for 15 NC 420 (not fulfilled)
Manufactured: One
In *Aéronautique Navale* Service: None
General Characteristics:
Twin-engine monoplane flying boat with floats.
Engines: 2 x Béarn 6D 07 developing 325 hp at 2,700 rpm
Propellers: 2 x Ratier three-blade variable pitch (model unknown)
Span: 15.9 m (52.16 ft) [4.75 m (15.58 ft)with wings folded]
Length: 11.2 m (36.74 ft)
Height: 3.81 m (12.5 ft)
Wing Area: 34 m² (365.98 sq ft)
Empty Weight: 2,895 kg (6382 lb)
Laden Weight: 3,876 kg (8545 lb)
Estimated Performance:
Maximum Speed: 300 km/h (186 mph) at 1,800 m (5905 ft) [270 km/h (168 mph) at sea level]
Touch-down Speed: 95 km/h (59 mph)
Catapultage Speed: 101 km/h (63 mph)
Endurance: 1,350 km (839 miles) at 240 km/h (149 mph)
Ceiling: 7,120 m (23,360 ft)
Crew: Three (pilot, navigator, radio operator/air gunner)
Armament (not fitted): One forward machine gun and one dorsal 2 x 75 kg (165 lb) G2 bombs

July 1943. The NC 420 undergoing floating tests in Antibes harbour. Note the pilot's cockpit offset to port.





SNCAC / NC 420.



SNCAO / CAO 30 & 300

Technical Programme Origin

The CAO 30 was a project developed by the seaplane branch of the *Société Nationale de Constructions Aéronautiques de l'Ouest (S.N.C.A.O)*, the former design office of the Loire-Nieuport company located at Saint-Nazaire. The project was drawn up in response to the clauses of the A49 technical programme issued by the Air Ministry on 6 July 1937: this called for the supply of a two-seat seaplane in the 'basic trainer' category, designated type ED-2 in naval nomenclature. The CAO 30 was in competition with four other prototypes, only one of these actually being built – the Minié-Cassin M.C.10.

History

The design office, led by Yves Jan-Kerguistel, proposed a simplified direct derivative of the Loire 130 to the CEPANA. This was, in part, a 13/16 reduction of the Loire 130, having the same wing but a hull of reduced size. Wind tunnel tests were carried out at the end of 1937 and one example was ordered by the Air Ministry under the designation CAO 30 in March 1938, at a price of 700,000 Francs. In the same month, *Contre-Amiral* Le Luc, chief of the Navy's general research department, expressed a desire to order ten CAO 30 in 1939. Powered by a 280 hp Salmson 9 Aba engine, this flying boat was built mainly on an ash frame, covered with birch plywood except for the upper surface of the wing centre section which was machined from Védal and the control surfaces, which were fabric covered.

Built at the Saint-Nazaire factory, CAO N° 1 made its first flight from the Loire estuary on 13 September 1938 in the hands of the factory's pilot Pierre Nadot, assisted by Leroy as mechanic.

The prototype CAO 30 at Saint-Nazaire with Pierre Nadot at the controls.

The prototype CAO 30 seen at Saint-Nazaire in its initial configuration with twin tail fins and rudders.

Right from the start, the CAO 30 appeared to be hampered by its weight, this being 300 kg above that specified in the original order. Also, during the first test, it exhibited worrisome features for an aircraft intended for use as a trainer, the most notable being tricky landing characteristics and also damage to the wooden Levasseur propeller from spray.

The aircraft nevertheless incorporated an ingenious system for compensating for the change in its centre of gravity with one or two pilots on board. This consisted of a 30 litre water ballast tank in the prow of the hull which could be filled by a hand pump while the aircraft was moored.

In October, an annular Townsend ring engine cowling was fitted in an effort to improve air circulation and cool the Salmson engine, which vibrated abnormally and tended to overheat.

After the 33rd test flight in October 1938, the aircraft went back to the workshop for modifications to the tail unit, taking two months, after which test flying was resumed on 21 December. It was now fitted with a single rudder and two small auxiliary oval fins at each end of the horizontal tail surface, this combination replacing the earlier twin fin and rudder configuration which had proved unsatisfactory in earlier flights.

However, this modification still penalised the power to weight ratio, the aircraft now weighing in at 1,850 kg instead of the initial 1,700 kg. On the whole, this first CAO 30 had a few latent defects: it was too heavy and proved incapable of reaching the required ceiling of 4,000 meters, use of the flaps tended to put the aircraft into a sharp dive considered dangerous for inexperienced pilots (altogether too much for a trainer!), its floats did not have sufficient volume and it suffered from lateral instability at low speed with a tendency to immerse the starboard float during take-off.

In addition, the enlargement of the wing tips compared with the original version, intended to reduce the touchdown speed, had weakened the wing structure. Henceforth this led to aerobatics being forbidden, a programme requirement. Finally, the Levasseur airscrew proved to be inefficient.

Despite all these risks, the evaluation programme continued regularly and, on 3 January 1939, the CAO 30 was into its fortieth test flight. It made its 75th flight on 20 April 1939 and was examined at Saint-Nazaire by a commission of experts from the seaplane department of the Air Ministry,

The prototype CAO 30 in its final form, suspended from a crane at Saint-Nazaire. (Photo: 'Je me souviens' *association).*

Final design of the single vertical tail plane on the prototype.

which proposed only a few minor modifications to the cockpit area to '*give more room for the pilot's knees*'.

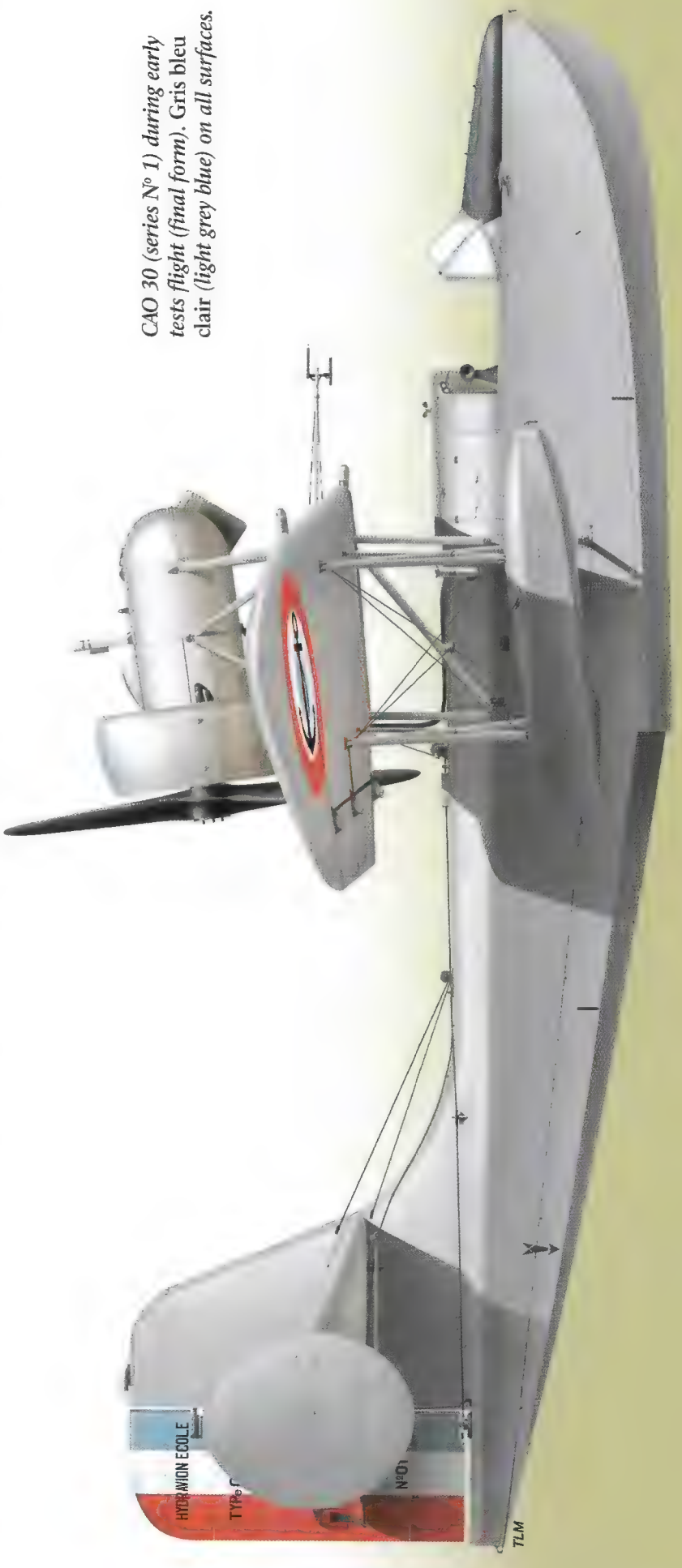
A second CAO 30 had been ordered in the meantime and was completed in mid-April. It made its first test flight lasting only 21 minutes on 12 May 1939 in the hands of Nadot and Leroy. This was an improved version with a strengthened hull and larger floats.

Even though the speed attained during a dozen flights was slightly better than with the prototype (195 km/h compared with 180), engine overheating continued. Also, as with N° 1, it was also unable to meet the aerobatic and maximum ceiling requirements of the specification. As a result, the Air Ministry let it be known that it would not sign a definite contract since the aircraft appeared unable to meet the demands of the technical programme. Nevertheless, presentation to the CEPA for testing was approved. On 3 July 1939, CAO 30 N° 2 was flown by Nadot and Leroy to Saint-Raphaël via Hourtin, Berre and Marignane.

It was now registered FW-171 and bore Naval markings[1]. Four days later it began tests at CEPA, flying speed runs over the base, still flown by Nadot. It was taken on charge by the CEPA on 18 July after a final take-off in a cross-wind in the hands of the factory pilot. While testing of N° 2 continued at Saint-Raphaël, the prototype's engine seized and was ruined during its 102nd flight at Saint-Nazaire on 20 October 1939. This incident brought the test programme of the prototype to an abrupt halt after 61 hours 20 minutes and its career ended there and then.

After a little more than 50 hours test flying, the second CAO 30 was transferred from Saint-Raphaël to Hourtin on 23 November 1939 for further testing there. It was still there in January and February 1940, still carrying the registration FW-171, having made only a dozen test flights during that period.

Paradoxically, the commander of the Hourtin seaplane base test flew it in December and found it satisfactory. Evidently, despite its



CAO 30 (series N° 1) during early tests flight (final form). Gris bleu clair *(light grey blue) on all surfaces.*

1. The civil registration 'F-W-171' borne by CAO 30 N° 2 was delivered from a series reserved for aircraft, either civil or military, needing an 'exceptional permit to fly' as in the case of the Potez-CAMS 141 Antarès which was registered 'F-W-071' during testing.

teething problems, the aircraft represented a clear technical advance in comparison with the other types of training flying boat in service there (the FBA 17 HE2 and CAMS 37E). A complementary report made by the sailors at the beginning of 1940, nevertheless stated that '*this seaplane can only be confided to pupils who are already well trained*', a constraint which of course went against the specification requirements for this type of aircraft.

But strategic considerations ruling since France entered the war, now had priority over any principle of precaution. On 13 February 1940, the Air Ministry ended up placing an order with SNCAO for 40 CAO 300 flying boats, the series version of the CAO 30. In addition to normal training duties, this type of aircraft was now also to serve for blind flying training, by fitting a retractable opaque roof which could be extended over the head of the trainee pilot and attached to the windscreen frame so as to block external vision. The authorities also did not fail to remind the manufacturer of the necessity to improve '*the strength of the airframe to make it correspond to programme requirement*'. Amazingly, the Technical and Industrial General Directorate called for the replacement of spruce in the airframe by a more readily available alternative in view of '*increasing supply difficulties*'.

No doubt this latest demand would have inevitably led to manufacturing delays and the need to recalculate structural resistance. On the other hand, the total weight of the aircraft was not to exceed 1,750 kg for aerobatic missions, while the design office proclaimed an impossibility to get below 1,826 kg. The Admiralty wanted the forty aircraft delivered before the end of the year at the rate of two to six examples per month.

But according to SNCAO management, taking account of the workload at the Saint-Nazaire factory, the fulfilment of this order would call for its division between two production sites, with the wooden wings of the CAO 300 being manufactured at the Issy-les-Moulineaux factory which was building L.N. 40 dive-bombers and the hulls being constructed at Saint-Nazaire.

On 15 February 1940, CAO 30 N° 2, the only one of the two prototypes still flying, went to Saint-Nazaire to be fitted with floats of larger volume; it was brought back to Hourtin on the 21st by the factory pilot Creton. It does not appear to have flown again at Hourtin after that date. Its ultimate fate is not known, but it was probably discovered there by German troops in 1940 and dismantled afterwards.

Fine picture of CAO 30 N° 2, coded F-W-171, seen at Saint-Nazaire, on 20/3/1940 (note motor boat in background with S.N.C.A.O factory markings.

Aircraft N° 1 was still at the Saint-Nazaire factory in September 1941 with its engine and propeller less its wings, which were being used for static testing. There is no trace of it after then.

Quite evidently, the SNCAO management was obliged to give priority to manufacture of the Loire 130 at Saint-Nazaire and this, combined with the disorder surrounding the debacle, put an end to any hope of delivering forty CAO 300s before the Armistice was signed.

Contracts and Orders

Order N° 2363/2B of 19 March 1938: one CAO 30 prototype.

Order for a second CAO 30 by additional contract clause during 1938.

Air Ministry order N° 3162 D.G.T.C of 13 February 1940: 40 CAO 300 (order not fulfilled).

Regularisation contract N° 273/41-DP dated 22 January 1942 from State Secretariat for Aviation for a total of 2,314,300 Francs ('a posteriori' payment for CAO 30 N° 2).

Manufactured: Two

In *Aéronautique Navale* Service: One (1939 – 1940)

Units: CEPA and Hourtin pilot training school.

General Characteristics: (final fin version)

Single-engine monoplane flying boat trainer with floats and wooden hull.

Engine: 1 x 280 hp Salmson 9 Aba air-cooled pusher

Propeller: 1 x Levasseur 1040

Span: 15 m (49.21 ft)

Length: 9.23 m (30.28 ft)

Height: 3.46 m (11.35 ft)

Wing Area: 29.27 m² (315 sq ft)

Empty Weight: 1,300 kg (2866 lb)

Laden Weight: 1,826 kg (4026 lb)

Maximum Speed: 195 km/h (121 mph) at 2,100 m (6890 ft)

Touch-down Speed: 89 km/h (55 mph)

Practical Ceiling: 3,625 m (11,893 ft)

Climb Time: 12 min 36 seconds to 2,000 m (6562 ft)

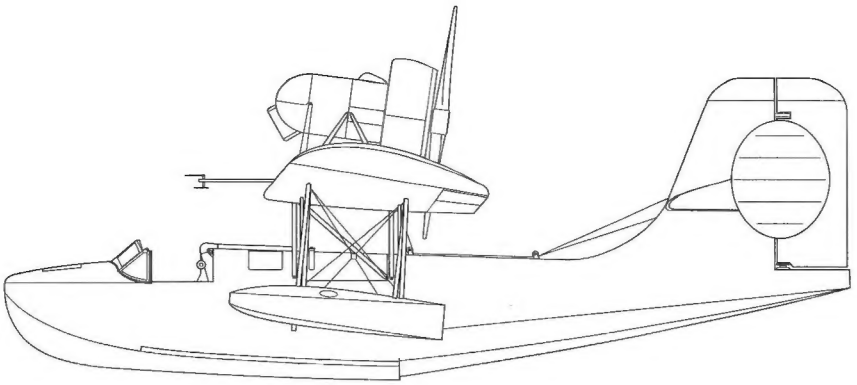
Take-off Time: 18 sec

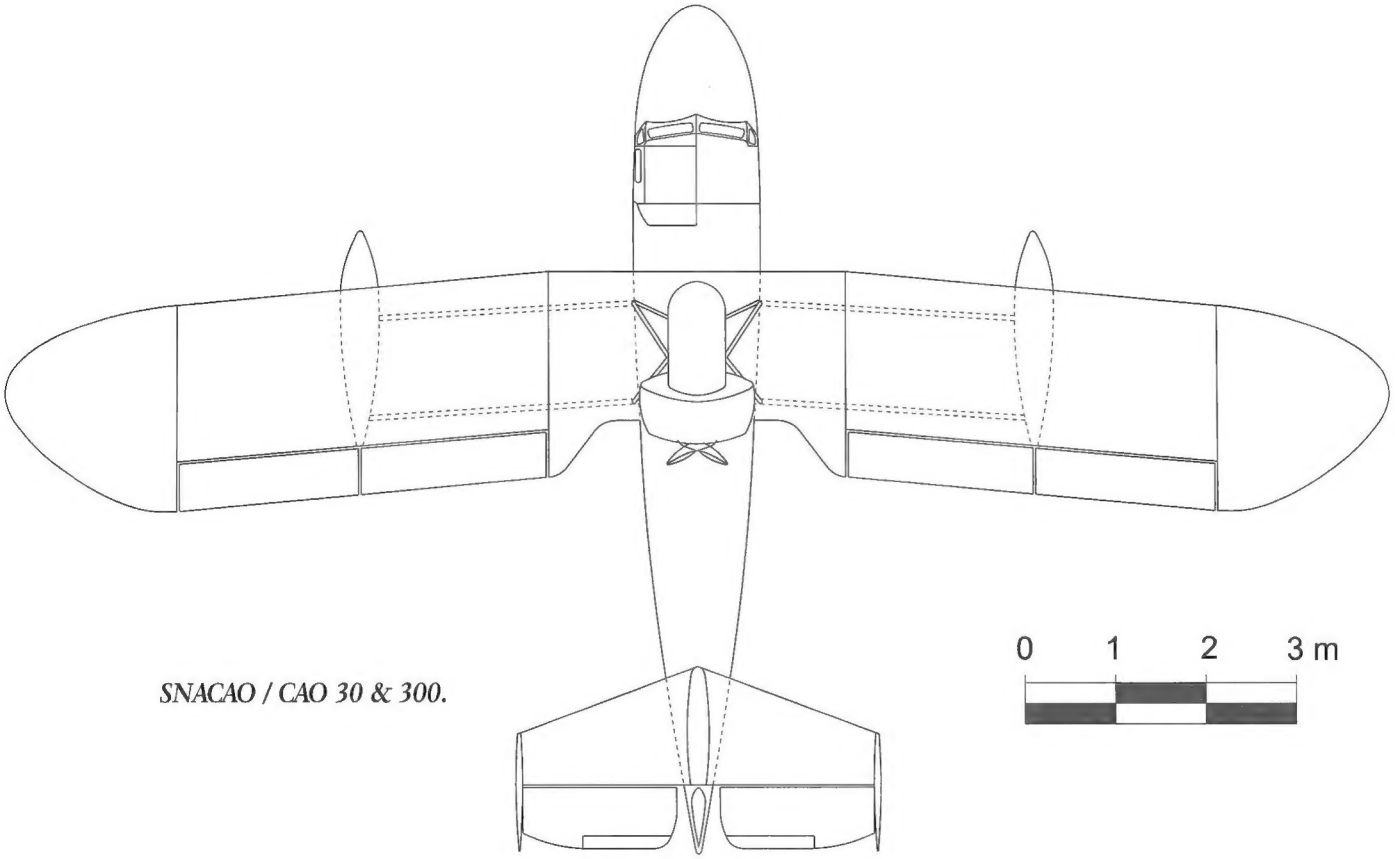
Endurance: 5h 30sec at economical cruising speed of 140 km/h (87 mph)

Crew: Two (1 instructor, 1 pupil)

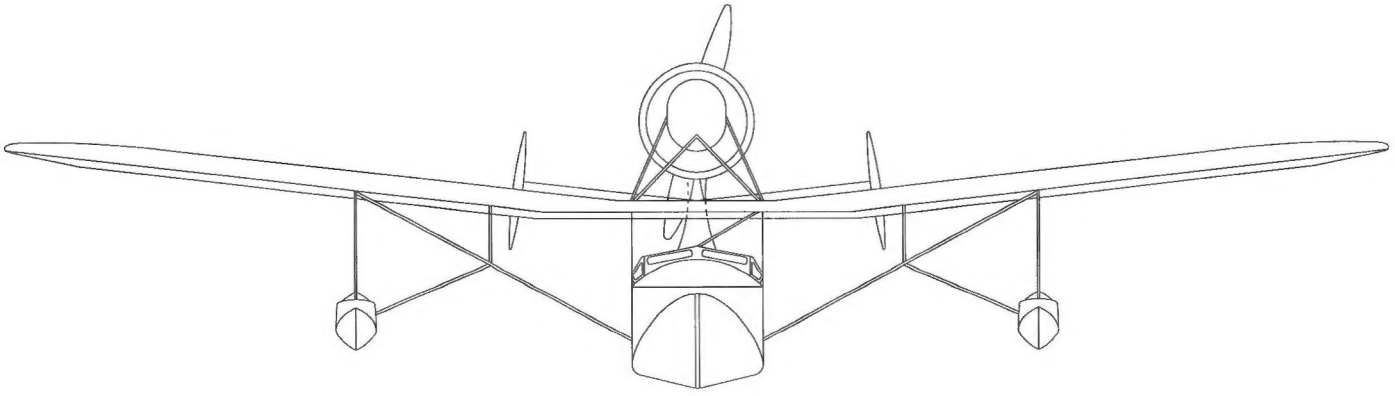
Armament: None

CAO 30 N° 2 temporarily registered F-W-171 (Saint-Nazaire – 1940). Gris bleu clair (light grey blue) on all surfaces.



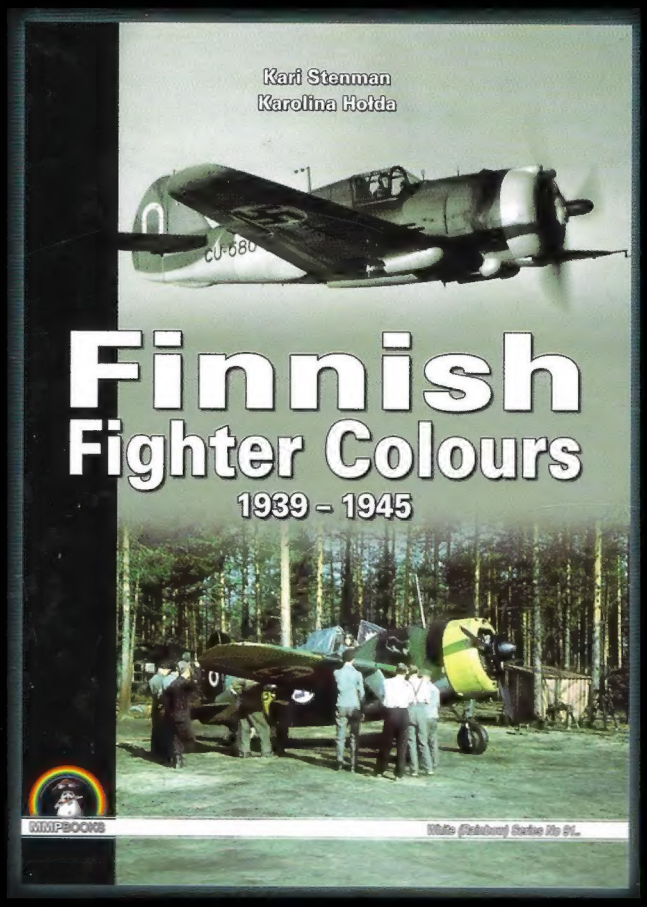


SNACAO / CAO 30 & 300.



An in-depth study of French military flying boats in service or under development during WW2. All the aircraft, large and small, are described in detail and their operational service outlined. Includes a comparison of French and German hydroplane strengths at the start of the war. General arrangement drawings of every type are included, plus colour profiles and many photos. Essential reading for flying boat enthusiasts and students of WW2 aviation history.

Forthcoming



ISBN 978-83-63678-06-7